

Full Throttle

Pushing the Envelope of Flight Simulation!

August/September 1998

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REVIEWS

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- *Cleared to Land*
- *DEA—Justice From Above*
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**Getting Your
Pilots License**



**Flying the C-47
In World War II**

**How I Make Scenery
Justin Tyme**

**The E3
Exposition**

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Full Throttle

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Dear Flight Simulator Enthusiast,



Good News! As of July 1st, Full Throttle is now a division of Abacus Software.

So what does this mean for you as a reader?

Abacus is one of the pioneers in the computing industry. For over twenty years, Abacus has published quality software and computer books for literally millions of customers worldwide. In doing so, Abacus has earned a reputation as a top notch competitor and company with which to do business.

As a division of Abacus, Full Throttle is able to draw from the in depth experience of Abacus' extensive staff of flight sim experts and knowledgeable publishing professionals to bring you even better articles, information and news. Abacus also brings you a dedicated group of courteous and efficient customer service representatives.

So as a reader, you'll benefit from a much larger company that can meet your expectations as a flight sim and aviation aficionado and as a discerning shopper.

We're already busy organizing our staff so that we can deliver an even better Full Throttle for you beginning next issue.

Happy Flying,

Arnie Lee
Publisher

Pilot's Note: This information is not intended for use in actual flying situations. While the information is as realistic as possible, you should not use it for actual flying instruction. *Safe flying!*

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NOTAMs: New Products

For those of you who aren't familiar with the term, NOTAMs is an acronym for NOTices to AirMen. The U.S. Government issues NOTAMs regularly. This issue of Full Throttle includes our version of NOTAMs — an expanded new products section. It's a regular part of our magazine. The products listed are compiled from press releases and information provided by the respective authors and companies who supply the products. We've taken steps to verify the information with each author or company, but cannot be responsible for inaccurate features, specification or availability dates.

Combat Flight Simulator

Microsoft Branches Out

Borrowing some of the technology which has been developed over the past 15 years in the flagship product Flight Simulator and adding liberal doses of new features, Microsoft hopes to make their Fall release of **Combat Flight Simulator** another "must have." CFS fully supports 3D video cards and accelerator boards to achieve some very nice visual effects.



CFS will ship with about eight aircraft including the Spitfire Mk. I, Hurricane Mk. I, Messerschmitt Bf-109 G, P-47D Thunderbolt and P-51D Mustang in the air war campaigns over western Europe. These aircraft will have full instrumentation, authentic cockpits and armaments fitting for the 1940s era.



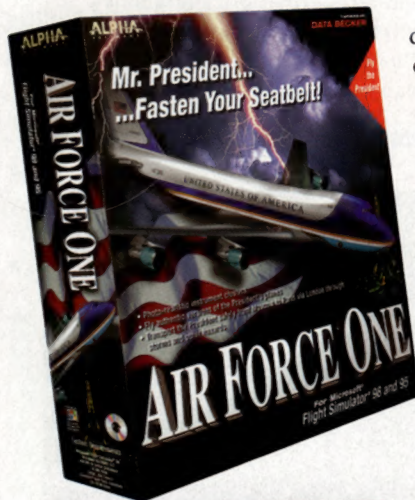
While CFS ships with about 400 miles of scenery covering Western Europe, Microsoft claims that it will be possible for 3rd parties to add new scenery since CFS is said to be very "compatible" with FS98 scenery.

Combat Flight
Simulator
(for Windows
95)

Microsoft
One Microsoft Way
Bellevue, WA 98009
Phone: 781-229-2924
Fax: 781-272-4876
<http://www.microsoft.com>
Available Fall '98
SRP \$59.95 each

New Add-ons from Alpha

Three Aircraft Collections



Alpha Software is set to deliver three new aircraft add-ons for MS Flight Simulator. The three are **Air Force One**, **DC-3** and **Airbus**.

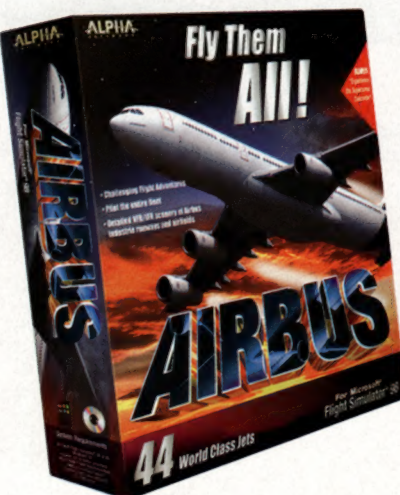
Air Force One includes planes that have been part of the U.S. President's livery. It features five aircraft: Boeing 747-200; Boeing 707, Boeing 707 E3-A, Boeing 707-153 and Boeing 707-153.

The Moscow to Paris adventure challenges the airchair pilot to fly through storms, fog, turbulence and engine failures. You'll take off from Moscow's Sheremetjevo airport and scenery. The **Air Force One** guide includes a special section for beginners.

DC-3, nicknamed the "Gooney Bird", includes ten various models of this legendary aircraft. Each plane has more than 40 gauges, landing lights and cowl flaps.

The package also includes historical and performance information, documentary videos and photographs.

Airbus is a collection of twelve models and 44 aircraft. This new package includes the A300, A300-600F, A300-600T, A300B4, A310-200, A310-300, A319, A320-200, A320-300, A330-300, A340-200 and



Portugal Scenery

Visit the World Expo

Three designers have pooled their talents to create a new scenery of Portugal. Luis Viera de Sa, Miguel Kispo Silva and Carlos Pimentel recently released **Portugal 98** in time for the start of the Lisbon's World Expo which began in June.



This quality scenery includes detailed cities, highways, coastlines and airport buildings throughout Portugal. And the price is right!

Portugal Scenery

Freeware for MS Flight Simulator
From FS Portugal Web site
<http://209.116/148.62/fsportugal/portugal.zip>

A340-300, all with working gauges. You'll fly out of the Airbus facilities in Toulouse, France with the included detailed scenery.

Air Force One for FS95 and FS98 DC-3 for FS98 Airbus for FS98

Alpha Software
168 Middlesex Turnpike
Burlington, MA 01803
Phone: 781-229-2924
Fax: 781-272-4876
<http://www.alphasoftware.com>
E-mail: prss@alphasoftware.com
SRP \$29.95 each

Airport 2000

Wilco's New Release

Coming on the heels of their Tahiti Scenery is Wilco Publishing newest add-on **Airport 2000**. The package has scenery for these well-known airports: Brussels Zaventem, Paris Charles de Gaulle, Frankfurt Main, New York JFK, Los Angeles LAX, Atlanta Hartsfield and Tokyo Narita.



More than 50 adventures and approaches are included to link the various airports. Designed by professional pilots, the adventures are interactive and feature ground traffic control, missed approach procedure GPWS and more.

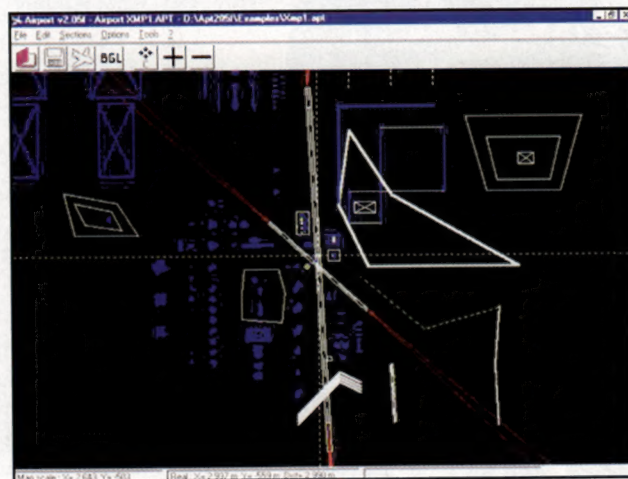
Airport 2000
For Microsoft FS98

Wilco Publishing
Chaussee de Ruisbroek 290
B-1620 Brogenbos, BELGIUM
Phone: + 32-2-331-32-90
Fax: + 32-2-331-07-51
<http://www.wilcopub.com>
Email: info@wilcopub.com
SRP: about \$42.00

Airport 98

Scenery Design

Brian McWilliams is leading a group of programmers named The Flight Sim Group. They've teamed to make new and improved scenery design software. Although **Airport 98** is now in early alpha tests, Brian is aiming to meet an October 98 schedule for completion.



Airport 98 will let you create your own scenery or edit existing scenery. Originally designed by Pascal Meziat, planned features are:

- 3D virtual fly-thru during and after design
- 300+ pre-designed objects
- 200+ new improved textures
- VOD 2.7 3D object designer included
- Full visual design of the scenery

Airport 98

Freeware for MS Flight Simulator
From The Flight Sim Group
Contact: Brian McWilliams
<http://www.flightsim.com/airport/>
E-mail: emcwill792@earthlink.net

Fighter Legends New Release in EA's Jane's Series

If you're a combat flyer, you'll want to know about **Fighter Legends** from Electronic Arts. Scheduled for release in the third quarter, you'll fly WWII aircraft in Western Europe.



There are more than seventy missions which are drawn from late 1944 at the Battle of Ardennes. **Fighter Legends** supports 3D video cards using Direct 3D, OpenGL and 3Dfx Glide to bring exacting detail and high frame rates as you fly any of the seven aircraft in dogfights with the enemy.



Fighter Legends:
Europe 1944
For Windows 95

Electronic Arts
1450 Fashion Island Blvd
San Mateo, CA 94404
Toll Free 800-245-4525
Phone: 650-513-7555
Fax: 650-513-7035
<http://www.ea.com>
Fighter Legends: Europe 1944
Available: 3rd Qtr 98
SRP About \$59.95

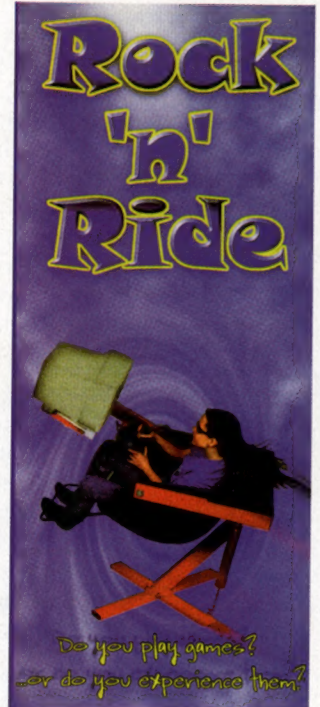
Rock 'n' Ride Motion Platform

To "feel" the sensation of flying, the **Rock 'n' Ride** will put you into a movable seat. Powered by a genuine air compressor, this interactive motion platform moves you and your monitor up to 60 degrees.

Rock 'n' Ride works with PC computers and Sony Playstations and adds action to flying and driving games.

Rock 'n' Ride

Rock'n'Ride
PO Box 511
Helendale, CA 92342
Toll Free 888-431-9893
Phone: 760-244-1893
Fax: 760-244-6383
<http://www.rocknride.com>
E-mail: rocknride@hotmail.com
SRP \$495.00

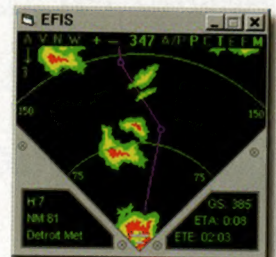


Flight Director 98

EFIS and Weather Radar

Flight One has released **Flight Director 98** for users of Microsoft FS98. This innovative add-on lets you fly anywhere in the world using actual weather conditions that are delivered live from the Internet. The weather radar is then displayed on the scope.

Additionally, the Electronic Flight Information System displays navaid, moving map and GPS which are connected to the autopilot.



Flight Director 98
For Microsoft FS98

Flight One
PO Box 14692
Atlanta, GA 30324
Phone: 404-231-1180
Fax: 404-231-1180
<http://www.flight1.com>
E-mail: sales@flight1.com
SRP About \$49

Thrustmaster Flight System for PC Pilots

Known for making innovative, quality game controllers, Thrustmaster has started shipping **Thrustmaster Flight System** – a set of flight controllers for more authentic flying. The package includes its TOP GUN joystick, the ATTACK Throttle and the ELITE Rudder Pedals.

The TOP GUN joystick is modeled after the F-4 Phantom grip and the ATTACK throttle gives arced throttle movement with idle and afterburner detents, four programmable buttons and 3-way dogfight switch. The ELITE rudder pedals provide spring loaded pivot action and gives precise yaw control. In addition, the **Thrustmaster Flight System** includes a copy of Sierra's **ProPilot** simulator which takes advantage of the new virtual cockpit.



Thrustmaster Flight System

Thrustmaster
7175 NW Evergreen Pkwy #400
Hillsboro, OR 97124
Phone: 503-615-3200
Fax: 503-615-3300
<http://www.thrustmaster.com>
Email: kathryn@thrustmaster.com
SRP Less than \$159.00

Can You Use a PAL?

Programmable Shortcuts

Precision Flight Controls has announced the August release for their new **PAL – Programmable Active Link**. The PAL is a small console with 96 keys. The keys are programmable and are “coupled” to different flight sim software. These keys in turn provide one-stroke shortcuts for many commonly used simulator tasks.

The **PAL** plugs into your existing keyboard connector. You can then download “macros” from the PAL editor for the game that you’ve selected. **PAL** includes overlays for Microsoft Flight Simulator 98, Graphic Simulations F/A-18 and Mission Studios Jetfighter III.



PAL - Programmable Active Link For Windows 95

Precision Flight Controls
11500 Sunrise Gold Circle
Suite D
Rancho Cordova, CA 95742
Phone: 916-638-1310
Fax: 916-638-1426
<http://www.flypc.com>
E-mail: info@flypc.com
SRP \$119.95

CH Products Joystick Switchbox

Those of you who have multiple game controllers will be glad to hear of a solution for “cable snafus.” CH Products has released their **Joystick Switchbox** which lets you connect up to four joysticks to your PC.



The switchbox automatically changes to which ever joystick is being used at the time thereby eliminating the disconnect/reconnect problem. CH Products says that it is compatible with all standard game controllers including joysticks, flight yokes, rudder pedals, throttles and gamepads.

Joystick Switchbox

CH Products
970 Park Center Drive
Vista, CA 92083
Phone: 760-398-2518
Fax: 760-598-2524
<http://www.chproducts.com>
E-mail: sales@chproducts.com
SRP About \$30

RAF Collection

History from Interactive Associates

U.K. based Interactive Associates has released a new collection covering six decades of Royal Air Force aircraft. It features 30 aircraft for FS98 including the Harrier, Tornado, Vulcan Bomber, Hawker, Hurricane and more. The 12 all new panels complement the aircraft and can be used with others as well.

RAF Collection also includes more than 200 RAF, Army and civilian air bases and airports in England and Wales. The package, which is officially endorsed by the RAF Benevolent Fund, includes historical and technical info on each aircraft.

RAF Collection
For Microsoft
FS98

Interactive Associates
Unit A2/A3 Edison Rd
St. Ives
Cambridgeshire PE17 4LF U.K.
Phone: +44-1-494-511103
Fax: +44-1-494-511104
<http://www.theassociates.co.uk>
E-mail: mail@theassociates.co.uk
SRP: 24.99 GBP

Dynamic Scenery Utility

Konstantin Kukushkin's DynKit

Konstantin Kukushkin is one of the gurus of scenery design having provided "know-how" and utilities for several years. His latest tool is called **DynKit**.



DynKit helps users make new dynamic scenery objects. Using **DynKit** the user can:

- Convert Flight Shop aircraft to dynamic objects
- Insert new objects into dynamic scenery
- Find out how to create new objects

African Animal Safari

Aerial Sightseeing

Abacus, the "sister company" of Full Throttle, announces a new member of its "theme scenery series" **African Animal Safari**. You'll fly over the svelttes, jungles and national parks where you'll gaze the big game on the dark continent. You'll see authentic wildlife: giraffes, zebras, lions, elephants, wildebeasts and more.

You'll also fly to and from exotic and rustic destinations such as Casablanca, Azazibar, Alexandria, Pretoria, Khartoum, Nairobi and others. Includes more than 40 specially developed photo-realistic textures that bring out the ground covering and vegetation as you fly over the major highways and mountain ranges.



FS Action!
Scenery
For Microsoft
FS95 and
FS98

Abacus
5370 52nd Street SE
Grand Rapids, MI 49512
Toll Free: 800-451-4319
Phone: 616 698-0330
Fax: 616 698-0325
<http://www.abacuspublisher.com>
E-mail: sales@abacuspublisher.com
SRP: \$39.95
Available September 1998

The objects created with **DynKit** are compatible with Abacus' FS Action! Scenery and Rafael Sanchez's DOD tools. **DynKit** is free unless the objects are used for commercial purposes in which case there is a license fee of \$99.

DynKit

Freeware for MS Flight Simulator
From Konstantin Kukushkin
<http://kuku.terminator.com/fs/dynkit/>
E-mail: kukushk@pobox.com

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Introduces**

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For FS 98

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CD!*

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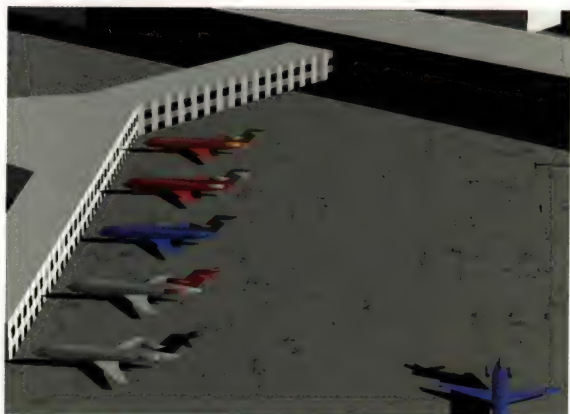
Dynamic Scenery in FS98

By Konstantin Kukushkin

Dynamic scenery refers to aircraft and ground vehicles that move. It adds tremendous realism to Flight Simulator airports. In this article Konstantin Kukushkin looks inside dynamic scenery to see how it works and what is new in FS98.

Dynamic scenery—moving aircraft and ground vehicles—adds tremendous realism to Flight Simulator airports. Here we will look inside dynamic scenery to see how it works and what is new in FS98. I will show how easy it is to create your own moving objects. Finally, I will give some practical tips for installing dynamic scenery and describe how to resolve common problems.

Although dynamic scenery is provided by Flight Simulator, you won't see any until you activate it: click World | Dynamic Scenery... in the FS menu bar, select a "Scenery frequency" and click each of the four buttons.



Dynamic Areas and Objects

Let's have a look at how dynamic scenery works. Like almost all scenery elements, dynamic scenery is stored inside scenery files, which are also known as *.bgl files. A *.bgl file can have one or more "sections." Each section has a special number, which determines the kind of information stored in it. For example, section 9 always contains static (visual) scenery, such as 2-D and 3-D polygons. Section 0 always contains VOR and ILS navaid data, and section 15 always contains dynamic scenery.

Dynamic scenery is grouped into rectangular areas. For example, there is a dynamic scenery area over Chicago that contains all moving objects at Meigs Field and O'Hare International airport. The default scenery has several other areas containing dynamic scenery, and various third-party sceneries add even more of them.

Objects inside such an area can interact with each other and, in FS98, with your aircraft, too. However, objects from different areas cannot interact with each other, and in fact, cannot even coexist. FS98 can only display objects from one area at the same time. This area is often called "active" and normally covers the

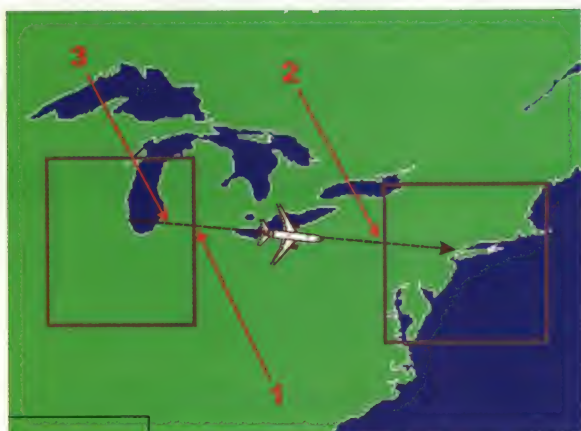
aircraft location. When the aircraft is above a region not covered by any dynamic scenery, there is no active area.

As the aircraft enters a dynamic scenery area, FS98 loads the dynamic scenery .bgl file into memory. Dynamic objects appear and start moving. However, if there is already an active dynamic area loaded, FS98 will not load the new area until the aircraft from the old one has left.

When your aircraft leaves a dynamic scenery area, FS98 removes the dynamic scenery from memory. Dynamic objects belonging to that area disappear. As an illustration, during a flight from Chicago to NYC, you would first encounter dynamic scenery near Chicago. At point 1, you would leave the rectangular boundary defining the dynamic scenery area around Chicago, and that dynamic scenery would be removed from memory. At point 2, you would enter the dynamic scenery area around NYC, so it would be loaded into memory. On this illustration you can also see that the boundaries for default areas are really very large, especially when compared with small areas where dynamic objects actually move. If there were a small dynamic scenery area near point 3, you would not see any objects from it during the trip, because the large dynamic area for Chicago would still be active and prevent other areas from being loaded.

Dynamic scenery stored in section 15 of a .bgl determines the movement of objects. It contains instructions like:

Dynamic Scenery in FS98



Place a Cessna at N41:51:14.1230
W87:36:27.1339

Wait 10 seconds

Accelerate to 60 kts

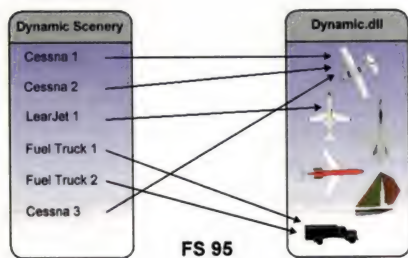
Begin rotation around the X-axis

Begin raising altitude at 1m/s

These instructions determine how the object should move, but not what it should look like. They merely contain a hint ("Cessna") for displaying the aircraft. MSFS is responsible for giving it the proper visual appearance. One of the most significant improvements in the scenery engine of FS98 is greater flexibility in displaying objects.

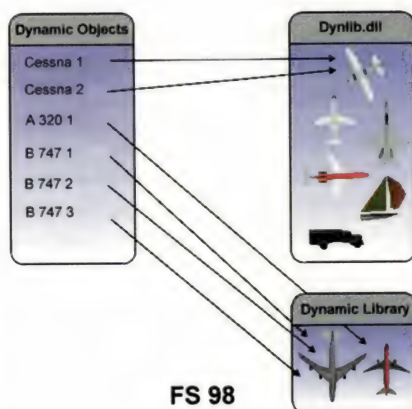
FS98: What's New

Before FS98, MSFS could only recognize six types of objects. There were four types of aircraft, a yacht and a fuel truck. Their shapes were hard-coded into the file *Dynamic.dll*, which was part of FS95. As a result, there was no way to introduce new objects, because it was impossible to tell MSFS how they should look.



In order to overcome this limitation, FS98 introduced a new Section 10 in the *.bgl file structure. Such scenery files serve as libraries that store shapes of dynamic scenery objects. With the information from section 10, FS98 knows what the objects look like and how to display them. The shapes of the eight default objects in FS98 are stored in the file *Dynlib.dll*.

A dynamic library file alone will not add anything visible to the scenery. However, dynamic sceneries written for FS98 can reference objects in dynamic libraries, and thus bring new objects into action. Every object shape in a dynamic library has a unique ID string—a long string of numbers assigned to it. A dynamic scenery .bgl file uses the same ID string to describe the shape the object is supposed to have and its corresponding texture(s). If there is no shape with this ID string in any dynamic library, nothing will show up.



Dynamic libraries do not comply with the layering scheme MSFS normally uses to avoid scenery conflicts. Dynamic scenery in one layer can use dynamic libraries from any other layer. And if two dynamic libraries have shapes with the same ID string, only one shape will be accessible to all dynamic sceneries. For example, if one scenery uses an ID string for a Boeing 747 and another scenery uses the same string for a DC-3, you may see a lot of DC-3s at a busy international airport. Even worse, they would be hanging a few feet in the air, because of their lower

landing gear height! Fortunately, the probability of two random ID strings being equal is extremely small.

Besides new object shapes, FS98 also made other improvements to the dynamic scenery engine. Dynamic objects are no longer blind. Each object has a so-called "collision avoidance radius." If a dynamic object moving on the ground comes within this radius from your aircraft or some other dynamic object, the dynamic object will stop moving until the obstacle disappears. In a similar fashion, dynamic aircraft on final approach can now "see" if the runway is occupied and will abort the landing if it is. Or more likely, they will simply stop in mid air. Nothing is perfect!

Installing and Removing Dynamic Scenery

You can install and remove sceneries, including those with dynamic objects, while FS98 is running. Of course, you can also exit FS98, change disk files and restart it again, but this takes time and interrupts the flight experience. After all, if you just forgot to install the destination scenery for a fly-in, you will not want to disappear from the radar screen while you are correcting the mistake!

These hints apply to both installing standalone dynamic sceneries and installing complete scenery packages containing dynamic scenery. Procedures for uninstalling are very similar.

Always check the scenery documentation! Maybe it contains important instructions for the installation.

If FS98 is running, disable dynamic scenery by clearing all checkboxes in the **World | Dynamic scenery** dialog box. This will unload the active dynamic scenery, if any, from memory. If the scenery you are installing or removing has components other than dynamic scenery, like static elements, put FS98 on pause in order to avoid file accesses while you are manipulating files.

Make necessary changes to disk files, like unpacking or deleting scenery files.

If the scenery you are installing contains its own dynamic libraries, the textures used by new dynamic objects must be installed into the main FS98\Texture directory. If you

install the textures into the local Texture directory instead, you will likely see non-textured objects.

If FS98 is not running, start it.

Immediately make the necessary changes in the scenery library. If you don't need to make changes there, just open the scenery library dialog box (**World | Scenery Library...**), click **Files...** and click **OK** twice. This directs MSFS to rebuild its internal list of *.bgl files and will help avoid problems, like MSFS suddenly terminating with an "Error opening file" message. If you put FS98 on pause, resume flying.

Enable the dynamic scenery. This will immediately load the dynamic scenery into memory if you are inside a dynamic area. Otherwise, dynamic scenery areas will be loaded as you enter them.

Making Your Own Dynamic Scenery is Easy!

Creating your own dynamic scenery is a lot of fun. Modern tools make it so easy that you don't need any scenery design knowledge at all. You can populate your airport with aircraft from your favorite airlines. You can create a dense pattern around your airport and practice pattern flying. Or, you can just record a flight, have the dynamic scenery repeat it and try following "yourself."

This article is written for non-scenery designers. Therefore, I will not go too deep into technical details, but will simply describe how I created a simple dynamic scenery myself. Everyone can create one by simply following these steps.

There are several tools for creating dynamic sceneries. Everyone who can fly can easily create complex dynamic sceneries with **FS Action! Scenery** from Abacus and with **DOD** (Dynamic Object Designer) by Rafael Sanchez. Several other tools allow you to place non-moving dynamic scenery objects into the scenery. Finally, real experts can use SCASM and FSASM scenery compilers to write code by hand.

In my opinion, the best tools available now are FS Action! Scenery and DOD. FS Action has the extremely useful ability to display the underlying scenery and preview

all movements, and many other unique features. DOD also allows creating moving objects by hand, without using a prerecorded flight path, but lacks many features found in FS Action. In my opinion, both programs are must haves.

The most convenient way to create dynamic scenery is to record your own flight path and have a dynamic object repeat it. This is how I made my first scenery with FS Action. I often make virtual flights out of Munich, Germany, not the least reason being that I live nearby. I always missed movement at the airport, which is pretty busy in real life. For my first attempt, I decided to add just one airplane that would taxi to the runway and take off.

I positioned myself at the Munich airport in Germany, chose **Options | Flight video...** and started a video recording. I taxied to the runway, took off and followed a standard departure route for a few minutes. Then, I

stopped the video recording. Because I was in a hurry to see results, I didn't do a proper landing, but simply reset the situation.

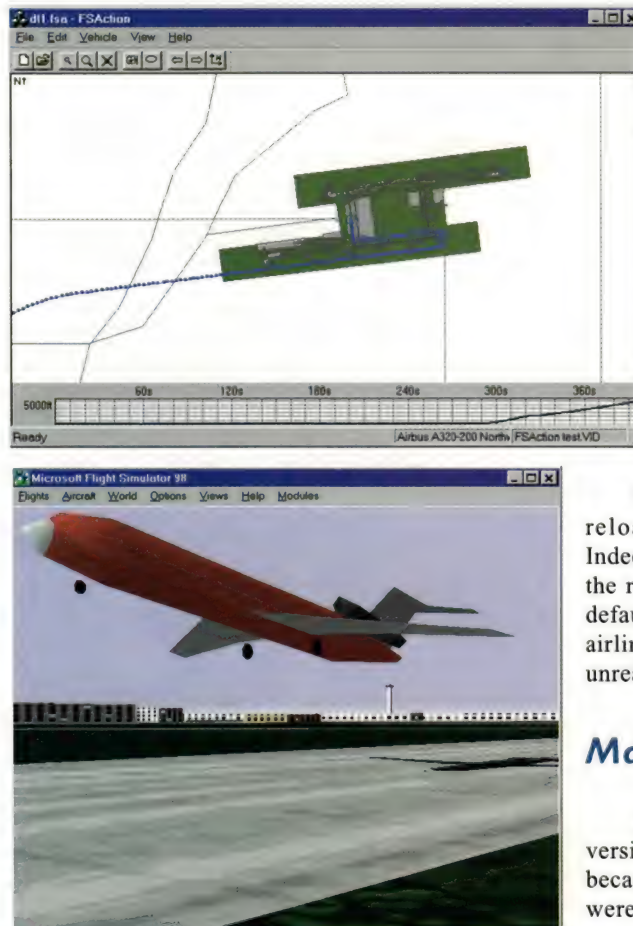
Next I started FS Action! Scenery, selected **File | Import Flight Sim Video...** and chose the video file I just recorded. My flight path immediately appeared in the window. I also wanted to display the underlying airport scenery. I chose **File | Read *.bgl File...** The big question now was, which of well over 1,000 *.bgl files on the CD-ROM contained the Munich airport, so I could display the airport in FS Action? Since I did not install any CD-ROM scenery onto the hard disk and I was already in Munich, these files had to be in the European CACHE subdirectory of my FS98 folder. Indeed, I found 18 files when looking into CACHE\EUROCACH\SCENERY. Some of them contained navids and AFD information and 11 files came into question. I tried all of them, and indeed found one containing the Munich airport.

I also needed to select the type of aircraft to appear in the scenery by using the **Vehicle | Settings...** dialog box. I recorded the flight path in an Airbus A320. The FS 98 file Dynlib.bgl does not have a shape for an Airbus, so I selected a Boeing 727 as a replacement. Finally, I selected **File | Create *.bgl File...** and saved the file into my test scenery directory. I have a special scenery layer called "test," which I use to quickly test scenery files without making changes in the scenery library.

I switched back into FS98 and reloaded the dynamic scenery. Indeed, I saw a Boeing 727 taxi to the runway and take off. But as all default objects, it wasn't painted in airline colors and thus looked a bit unrealistic.

Making New Objects

Dynamic sceneries in earlier versions of MSFS were a bit boring, because only a few types of objects were available, and they were plain-



Dynamic Scenery in FS98

colored, without textures. FS98 introduced dynamic libraries, which allow scenery designers to create their own textured dynamic object shapes. In order to make it really easy, I wrote DynKit. DynKit is a collection of tools for creating and using dynamic libraries. It contains **DynKit Hangar**, an easy-to-use program that allows creating dynamic libraries using existing Flight Shop aircraft with a few mouse clicks. Another program, **DynPatch**, allows you to easily replace objects in dynamic sceneries with the ones you created. Finally, there is some information and useful files for experts, who don't like doing things the easy way.

The central piece of DynKit is DynKit Hangar. It allows you to create your own dynamic libraries using Flight Shop aircraft converted with the FS98 converter. You can also use static scenery objects, but their disadvantage is that they will not have features like retractable landing gears.

I wanted to create a simple dynamic library containing the Airbus A320 in Northwest colors, made by Chris van Bijlert, which I already used for recording the flight path. I started DynKit Hangar and simply dragged and dropped the A3202NWA.MDL file from the FS98 Aircraft directory. Then, I saved the dynamic library file into my "test" scenery directory.

Finally, I needed to change the dynamic scenery I created earlier so that it would use the new A320 object. For each dynamic library it creates, DynKit Hangar writes an accompanying .DKI file, which contains information such as object names. FS Action can read .DKI files and use dynamic object shapes described there. I again opened the **Vehicle | Settings...** dialog box, clicked **Edit Vehicle List** and imported the .DKI file DynKit created for me. Then, I selected "Airbus A320-200 Northwest" from the list of available vehicles.

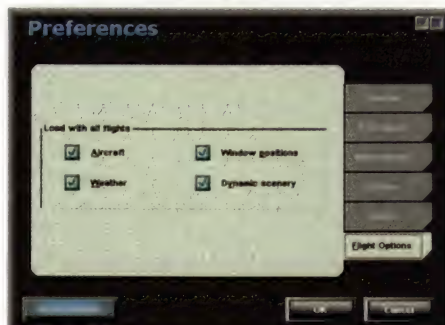
After I saved the *.bgl file again and reloaded the dynamic scenery into FS98, the generic Boeing 737 was replaced with an A320 in Northwest colors. It was still not quite realistic, because Northwest doesn't fly to Munich in real life!



Troubleshooting

Dynamic scenery doesn't show up

Check whether dynamic scenery is enabled in the MSFS menu system. Check in **World | Dynamic Scenery...** and in **Options | Preferences | Flight Options**.



Make sure the dynamic scenery is properly installed.

Make sure you are at the right airport!

Make sure FS98 is not in the pause mode. While paused, it does not load the dynamic scenery. If you need the pause mode in order to counter the laws of physics, use the slew mode instead.

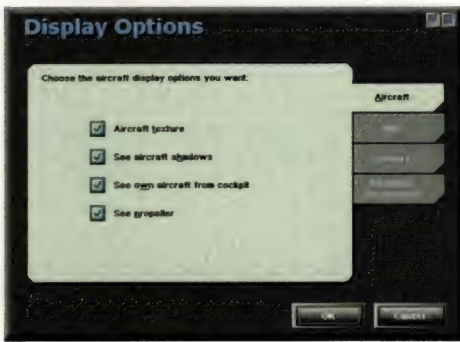
Maybe there is an overlap with some other dynamic scenery area. Move your aircraft to the airport where the dynamic scenery is supposed to appear. Disable dynamic scenery. Using the scenery library, move the troubled scenery layer to the topmost position in order to give its dynamic scenery the highest priority. Enable dynamic scenery again. If objects appear now, there is a scenery conflict. This scenery area will remain active as long as you don't leave it, but it will only work reliably if you identify and remove the conflicting dynamic scenery file. Check other add-on sceneries and default dynamic sceneries in the main SCENERY directory.

Maybe the scenery requires a dynamic library, which is not properly installed. Check the scenery documentation for details.

The frame rate is too low

Although dynamic scenery objects are relatively small, they often have a big impact on the frame rate, because they are very detailed. Here are a few ways to improve the frame rate:

Disable aircraft shadows. Although the shadows look much simpler than dynamic scenery objects themselves, they consume much processing power because each tiny part of the aircraft drops its own part of the shadow. The frame rate improvement will be especially noticeable when using a 3-D accelerator. To disable aircraft shadows, go to **Options | Preferences...** and click "Display", **Display Options**, "Aircraft".



Reduce the dynamic scenery complexity. In much dynamic scenery, the number of objects displayed depends on this setting. The fewer objects FS98 has to draw, the better the frame rate will be.

Narrow the field of view, by either increasing the zoom factor or maximizing the current window. Objects that are outside of the field of view do not have to be drawn, thus having less impact on the frame rate.

Disable aircraft textures. Drawing uniformly colored polygons is simpler than drawing textured ones. The improvement will be especially noticeable when using a 2-D graphics card without 3-D acceleration.

Textures on dynamic objects don't show up

If you intentionally disabled aircraft texture in order to achieve a better frame rate, fixing this "problem" will of course eliminate the achieved frame rate gain.

Make sure Aircraft texture is enabled in the same **Options | Preferences...**, "Display", **Display Options**, "Aircraft" menu.

If the scenery uses its own dynamic library, make sure the textures for this dynamic library are installed into the main FS 98\Texture directory. See the scenery documentation for details.

Maybe dynamic object shapes in the scenery were intentionally designed to be non-textured. You can't do anything in this case.

FS98 crashed with an "Error opening file" message

Most likely, you made changes to disk files, like deleting *.bgl files or recompiling your own dynamic scenery, without instructing FS98 to refresh its file list. You can't undo the crash that already happened, but in the future follow the procedures for installing and removing dynamic sceneries described earlier.

Dynamic scenery doesn't show up when I start FS98

Your default flight may not have dynamic scenery enabled. Of course, the location you are at must have an active dynamic scenery area. If your startup situation does not have dynamic scenery enabled:

Position your aircraft where you would like to be at startup.

Make sure dynamic scenery is enabled as described above.

Choose **Flights | Save flight...** Enter the flight name of your choice and enable "Make this the default flight." Press **OK**.

I hope this feature has been useful to you. The addition of dynamic objects with your default or add-on FS scenery greatly enhances the flight-sim experience. After all, who wants to fly to and from deserted airports?



FS Action! Scenery is a commercial tool from Abacus Software, Inc.:
www.abacuspublisher.com

DOD is freeware by Rafael Sanchez:
members.tripod.com/~rafasan/index.htm

DynKit is shareware by Konstantin Kukushkin, free for non-commercial use:
www.pobox.com/~kk/fs/dynkit/

The Airbus A320-200 used here is freeware by Chris van Bijlert:
www.geocities.com/CapeCanaveral/Hangar/8914/

How I Make Scenery

Part IV: Man-Made Geographic Features

By Justin Tyme

Justin Tyme continues his series on scenery design. In this installment, he'll show you how to create man-made geographic features. These include cities, towns and villages, freeway interchanges and obstructions such as radio towers and water tanks.

Following our analogy of the previous three installments, now that we have laid the foundation, built a framework and begun to apply the siding, we are ready to proceed with some landscaping. At this point we should have all the runways, elevations, ILS, ATIS, VORs and NDBs implemented and in beta testing. The scenery project should be well on its way to providing an accurate IFR environment for the end user. Note that some "serious" simmers are also real-world pilots who use Microsoft Flight Simulator to practice IFR procedures and they are not so interested in the eye candy that we are about to add. With this in mind, it is not beyond reason to go ahead and release what we have done thus far as version 1.0 after it has been verified with adequate beta testing. On the other hand, if you release it now, it is not likely to be too much different from the default scenery, and any scenery add-on should at least improve on the default. So, you make the call.

The vast majority of simmers, though, will want the visual enhancements we will address in this article. So, to paraphrase Orson Wells, "We will sell no scenery before its time."

In this installment, we will create man-made geographic features, such as cities, towns and villages, freeway interchanges, and obstructions such as radio towers and water tanks.

Cities, Towns and Villages

If you are working in the US and have used the state maps provided in ASD, most of the transportation and hydrographic features are already drawn for you. These will probably require some editing along the way, but for the most part are accurate. If you are working outside of the US, this section assumes you have already added the transportation and hydrographic features to your map by using the Region tool.

Referring back to Part One of this series, we will now put our geographical reference sources to good use. There are other sources mentioned in Part One, but I have always preferred to use Delorme's Atlas and Gazetteer series. These are ideal for constructing accurate geography because they include topographic contour lines, as well as basic land-use data such as urban, suburban, farmland, forest and prairie identifiers. Another source from Delorme that I have recently used is their Street Atlas USA CD. Though this source does not have the topographic contours of the Gazetteer series, it does have a more accurate and detailed representation of the whole United States. It shows urban and suburban areas, subdivisions, freeways (including cloverleaf interchanges), highways, roads, rivers, lakes and city parks—all those little details that add much richness to the visual environment.

We will soon begin laying out the major metropolitan areas of our scenery project, but first a few words about custom textures. The default textures, such as urban.r8 and the various burb*.r8 files, will provide an adequate representation of a city. However, you will notice that the street patterns on these textures usually run exactly north and south. To add that extra touch of accuracy, I recommend using Paint Shop Pro 5.x (or a similar utility) to rotate these textures to reflect a more accurate street pattern. It is a simple process which I will not delve into here, but an hour or so of experimentation with Paint Shop Pro should reveal good results. Figures 1-3 show some recent work on my upcoming PANJ98 scenery.



Figure 1: Keansburg area of New Jersey in Delorme's Street Atlas USA.

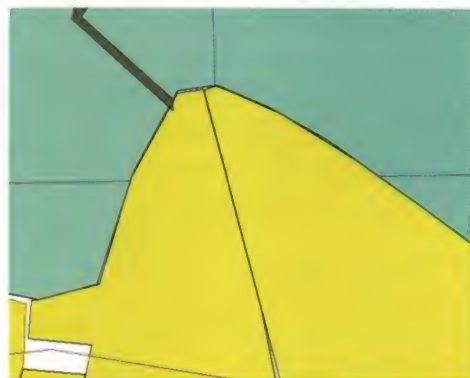


Figure 2: The same area in ASD (note the polygon boundary).



Figure 3: The effect that can be achieved by using rotated custom textures.

Figure 1 shows the Keansburg area of New Jersey in Delorme's Street Atlas USA. Figure 2 shows the same area in ASD (note the polygon boundary). Finally, figure 3 shows the subtly pleasing effect that can be achieved by using rotated custom textures. On the left of the image you can see the default urban.r8 texture and its north/south street pattern. To the right, you can see a custom version of the same texture rotated 20 degrees.

Let us assume you have created several custom, rotated textures to supplement the default textures. I have named mine "urban20.r8," "urban45.r8" and "urban60.r8," the numbers reflecting their rotation for easy recognition. I have also created variations of the burb*.r8 textures using the same naming conventions. With ASD open to your working map and your reference source handy (in my case, the Delorme Street Atlas CD), we will now begin filling, as example, the Greater Newark area of New Jersey.

Since we already have the transportation and hydrographic features implemented, we can use these as guidelines for determining the boundaries of our texture selections. Specific roads, highways, railways or waterways separate most neighborhoods in real-life cities. The objective here is to find the area of interest in the reference source and then find the corresponding area in ASD and duplicate it as closely as possible. By looking at street patterns and density in the reference source, you can determine which is the most appropriate texture. For instance, the dense downtown "grid" areas will require some version of the urban.r8 texture, while the less dense and greener suburban areas should have some form of burb*.r8.



Figure 4: Elizabeth, New Jersey, just south of Newark International Airport, as it appears in Delorme Street Atlas.



Figure 5: The same area duplicated in ASD.

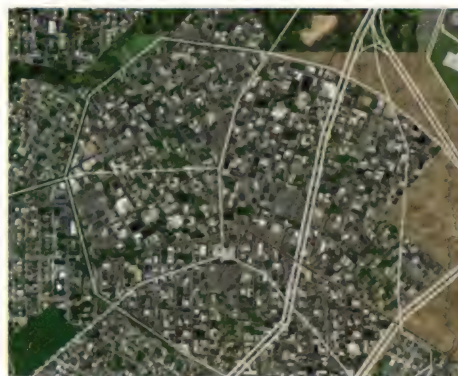


Figure 6: The same area as it appears in FS98.

Figure 4 shows the city of Elizabeth, New Jersey, just south of Newark International Airport, as it appears in Delorme Street Atlas. Note the "spoked" street pattern. Figure 5 shows the same area duplicated in ASD. Figure 6 shows the same area as it appears in FS98. Note the use of the rotated custom urban*.r8 textures to

achieve (well, close enough, I guess) the "spoked" street pattern and different angles of the burb*.r8 in the left part of the image. These little things will make your scenery distinctively realistic.

These polygons should be "roughed in" in Map view. Remember to select the polygon after roughing it in, pull down the **Edit** menu and choose **Send Behind**. This will send the polygon behind any existing regions, such as transportation features. You can then switch to Airport (or "Detail" view, as I prefer to call it) to fine-tune the placement of the polygon vertices.

A note about scale: Under the Visibility tab of the Polygon Properties dialog box, you will find a place to enter the scale. The smaller the number, the smaller and more defined the texture pattern will be. You will have to experiment here to attain the effect you desire. I have found that a scale of seven to ten works very well for city textures, depending on the density of the real-life street pattern showing in your reference source.

While we are on the Visibility tab, let us insert a reminder about Area Range, too. This should have been done way back in the beginning when we set up the Global Preferences. Your city polygons should not have a range in excess of 50 km, and 40 is usually sufficient.

As you might imagine, accurately portraying a major metropolitan area this way could require several hours or more of tedious work and much switching back and forth between ASD and your reference source, especially if you take the detail down to the neighborhood level. As an example, I invested over 40 hours in constructing the Greater Newark Metropolitan area for PANJ98. Nevertheless, the time invested is well worth the extra effort, and your end-user will be rewarded with spectacular visuals—and you will be rewarded with the satisfaction of a job well done.

Of course, you will want your whole scenery area to accurately represent all cities, towns and villages. I generally begin with the major Metropolitan areas and work my way into the countryside, using the existing transportation and hydrographic features as a guideline. If you see from your reference source that there is a town at the intersection of Interstate such-and-such and State Road

whatever, simply rough in the polygon(s) with the Region Tool and designate it as a city, apply the appropriate texture(s), then fine-tune it in Detail view. The same methods are used whether you are constructing a major Metro area or that tiny village of Podunk.

You will probably want to add some buildings to your downtown areas. This is most easily done from Detail View. Detail View will show an area encompassing an approximate 60-miles radius from an airport. So choose an airport near the city or town to which you want to add buildings and zoom out until you can see the city polygon. Center the map and zoom in. You will not see any buildings until the zoom is at least 1:4,200, so zoom in at least this far. Then simply click the Building Tool and place your buildings, configuring them to the desired dimensions. For realism, do not make them too big or too tall. Buildings in medium-sized cities rarely exceed 20 stories, and those in smaller towns rarely get above six to ten stories. You certainly do not want any skyscrapers jumping out of the countryside. If you are familiar with the city in question, so much the better. If not, just "wing" it and do the best you can, applying a little imagination as you work.

In most cases the default-style buildings will work fine. But for an added bit of realism, it's easy to create custom buildings with Raphael Sanchez's Visual Object Designer (VOD) utility. In this case, rather than choosing the Building Tool, choose the Macro Tool to insert your custom building.

This applies also to stadiums, arenas, factories and other structures you may build and insert into your scenery.

Well-constructed and accurate city areas can add much to your scenery package, so go ahead and spend extra time with them.

Cloverleaf Interchanges

Another element you can add to your scenery is detailed interchanges along your freeways. Using your reference source, zoom in (or use a magnifying glass, if you are using a paper atlas) until you can see the detail on the interchange. Determine how many segments you will need to construct the ramps. In Map view, use the Region Tool to create as many segments of the road region that you need. Then switch to Detail view and apply the ramps as required, inserting and moving points as needed until you have constructed the interchange. The ramps should probably be no more than 15 meters wide. Setting your Global Preferences for Roads to 15 meters width will speed up this process.

I always create the roads regions in Map view rather than Detail view for two reasons. First, if you create them in Map view, they will be visible in Map view. If you create them in Detail view, they will not be visible in Detail view. Also, there is an apparent bug in ASD that causes taxiways rendered as roads to assume the default taxiway texture, even if you designate them as non-textured. This can cause some visual confusion if roads (your freeway ramps) have the same texture as taxiways. So create your road regions in

Map view, then do the detail work in Detail view.

A note of caution: avoid trying to edit freeways in Detail view. I have experienced fatal errors when editing freeways in Detail view, so it is best to avoid doing so. This can be especially irritating if you have not saved

your map recently, as all your work will be lost. (Just a reminder: save your work often!) In fact, if you even inadvertently select a freeway in Detail view, you are likely to experience placement problems for the entire length of that freeway region, spoiling all your meticulous placement of ramps. So, be careful that you do not accidentally select a freeway region when in Detail view. If you need to edit a freeway region, do it in Map view, then switch back to Detail view and continue your work.

Bridges

Bridges, too, add that bit of detail that will distinguish a scenery package. There are many types of ready-made bridge macros available on the Internet. Raphael Sanchez's VOD comes with many different bridge configurations that can easily be dropped into your scenery. You can also make your own custom bridge macros.

If you are using the default maps that come with ASD, as stated previously, most of the rivers and transportation features are already in your map. The transportation features run over top of the rivers. If we do not edit the transportation features, after placing your bridges you will still see the transportation feature running under the bridge and over the river, which is not very realistic. The bridge should become a part of the transportation feature, not an addition to it.

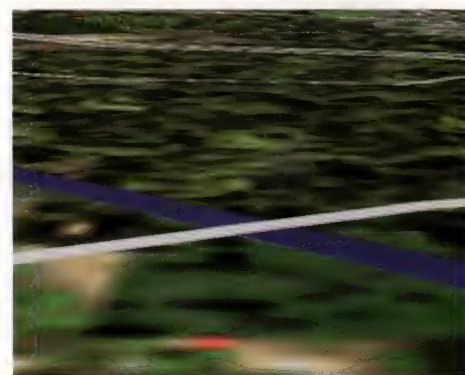


Figure 7

*...I generally begin with the major
Metropolitan areas and work my
way into the countryside, using the
existing transportation and
hydrographic features as a
guideline...*



Figure 8



Figure 9



Figure 10

Therefore, we will have to edit the transportation feature by "splitting" it, so it no longer runs over the river. In Map view, find the area where you want to insert the bridge. Zoom in, right-click on the transportation feature, and choose Edit. You will now see the handles (points) of the feature. Insert a couple of points on either side of a central point, if necessary. Now put your mouse cursor on the central point; depress the "S" key while depressing the left mouse button. This will split the region at

that point. Edit the two resulting regions so their ends come almost, but not quite, up to the river.

Before we place our bridge, here is a tip for editing the macro.txt file that will precisely place your bridge (or any other macro, for that matter). By default, ASD will depict macros according to the flags it finds in the macro.txt file. Find macro.txt in the ASDesign directory and open it in notepad. At the beginning of the file, you will find explanatory comments. There are four basic types of macro depiction flags. We will be using the fourth, the rectangle, which is represented by the flag 0104. For example, here is the line in macro.txt for a macro named "bridge8.scm:"

```
bridge8.scm 0104 L Lo
%Rotation Scale=1 Pyloncolor
Roadcolor Density=3
```

If you open the bridge8.scm macro in a text editor, you will find that at scale 1.0 this bridge is 100 meters long with 25-meters ramps on either end and is 20 meters wide. So, the total rectangular dimensions of the bridge are 150 meters long (100+25+25) and 20 meters wide. To have ASD depict this macro at its actual dimensions, simply edit this line to:

```
bridge8.scm 0104 L Lo
%Rotation Scale=1 Pyloncolor
Roadcolor Density=3 %L=20 %W=150
```

Now save and exit the macro.txt file and restart ASD. By adding "%L=", "%W=" parameters we have told ASD to depict this macro as a rectangle with the dimensions of 150 meters long and 20 meters wide. Of course, if you adjust the scale parameter of the macro, you will also want to adjust the "%L=", "%W=" parameters accordingly to reflect the new size of the macro. By the way, this method can be used with any macro and will facilitate precise placement of your objects.



Figure 11



Figure 12

Now back to the bridge placement. After you split the transportation region, find the same area in Detail view. Now click the Macro Tool, find the bridge in the list and place the macro. Since we have added the "%L=" and "%W=" parameters to the macro.txt file, your bridge should appear as a rectangle with the actual dimensions of the macro. Rotate and drag it as necessary, then match the ends of the bridge with the ends of the transportation features it is connected to. Now save your work and compile. Go into Flight Simulator and inspect your work, adjusting in ASD as necessary.

That's all for now and happy building until next time, when we will discuss natural geographic features: mountains, rivers, lakes and synthetic textures.

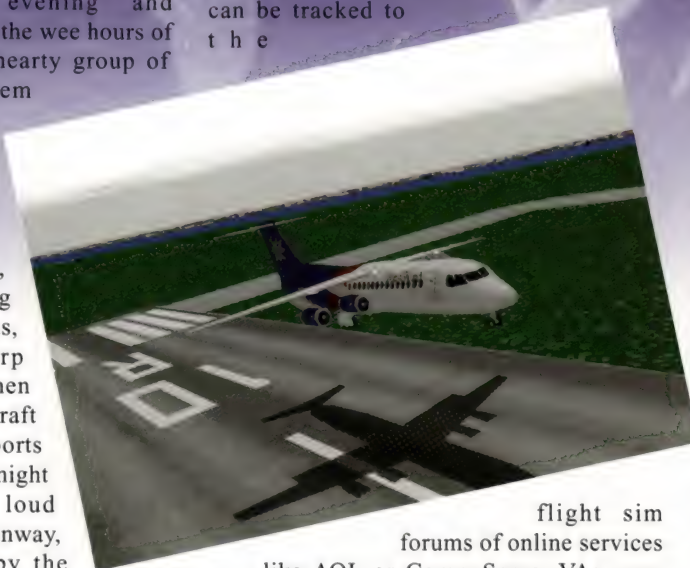
Virtual Airlines 101: A Crash Course

By Sean "Crash"
Reilly of WestWind
Airlines

In the late evening and occasionally into the wee hours of the morning, a hearty group of individuals—most of them seemingly rational, grown men—sit perched before computer monitors with sweaty palms tightly clenching flight yokes. Distant cries of "Honey, come to bed" have long since fallen on deaf ears as, with razor-sharp concentration, these airmen skillfully guide their aircraft down glideslopes to airports across the world. The late-night silence is shattered by loud screeches of rubber on runway, immediately followed by the deafening whine of reverse engine thrusters and finally by sighs of relief from the flight deck. The equipment, crew and thousands of virtual passengers have safely arrived at their destinations. It's another routine day in the life of a pilot flying for a virtual airline.

Do you constantly cast your eyes skyward, watching aircraft pass overhead? Have you ever dreamed of flying the heavy iron, wondered what it would be like to be a pilot for an airline, or wanted to develop a greater understanding of and appreciation for real-world aviation? Are you looking for more structure from your flight simming than booting up to the trusty Cessna at Meigs and then figuring out where you want to fly? If you answered yes to any of these questions, I highly recommend pursuing a "virtual career" with a virtual airline.

Virtual Airlines (VAs) are not a new concept—they've been around for several years. Though not certain of their exact origins, I believe their birthplace can be tracked to the



flight sim forums of online services like AOL or CompuServe. VAs were started by a small group of individuals with a passion for flight simulation, who decided to create the virtual equivalent to a real-world airline. They created a structure where flight sim enthusiasts could fly specified routes in aircraft other than the Cessna 182. With the introduction

of a software program called *Flight Shop*, by the now defunct BAO Software, it was possible for these enthusiasts to create custom designed aircraft of all types and colors. This further stimulated the growth of the virtual airline industry. Now it was possible to fly a much wider variety of aircraft than what was included in the default Flight Sim program (see Figure 2).

While VAs based on the on-line services grew in popularity and number, it really wasn't until the boom of the Internet that—if you'll pardon the pun—VAs really took off. As a conservative estimate, there are 100+ virtual airlines operating on either the 'net or online services today. They employ (virtually speaking) thousands, probably tens of thousands, of pilots of varying skill levels and aviation knowledge. These numbers will only increase as Microsoft continues to improve on its versions of Flight Simulator, as computer hardware improves and as outstanding add-on software programs designed to enhance the virtual flying experience (like *Squawk Box* and *Pro-Controller*, which enable you to fly with real-

Figure 2
The introduction of Flight Shop by BAO Software allowed enthusiasts to create custom designed aircraft and further stimulated the growth of the virtual airline industry. Now it was possible to fly a much wider variety of aircraft than what was included in the default Flight Sim program.



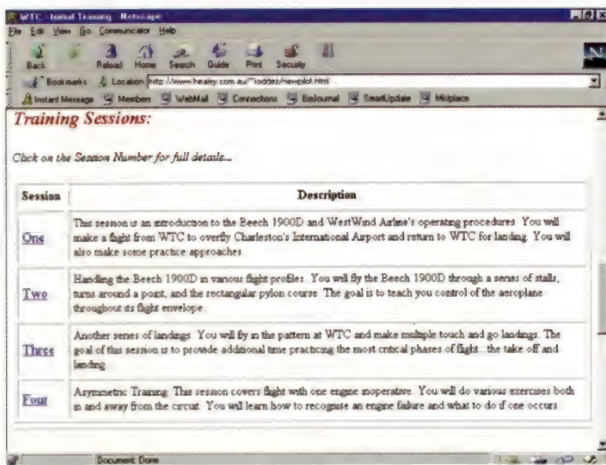


Figure 3
Once accepted, many VAs will require you to take basic training in their entry-level aircraft.

out tens of thousands of dollars in the process), you'd race down to the personnel office of your favorite airline. Then you would fill out an application and with some luck, be issued a polyester uniform and be hired on as an entry-level pilot. Most entry-level pilots begin by flying twin turboprops.

Switching to the virtual world, this is the jump-in point for most virtual airlines. Most assume you have secured the necessary training and accumulated the minimum number of hours to step into a twin turboprop aircraft, such as a Beech 1900D or Brazilia. Your first step, once you decide which VA you want to fly for, is to log on to their web site and follow the links to the pilot application form. Fill out the form and wait for a letter of acceptance. Once



Figure 4
In the virtual world, each VA offers a livery of aircraft—ranging from small turboprops to heavies like the Boeing 747 and 777—painted in its unique colors. When choosing a VA, consider both the fancy paint job of the fleet and how well each aircraft flies.

time ATC) are introduced. The future of flight simulation, and of the virtual airline industry, is extremely bright.

To give you a better sense of how a virtual airline operates, let's compare the structure of a typical VA to that of a real-world commercial airline. Let's say, one day you wake up and decide you want to pursue a career in aviation. The first thing you would do is go to your local airport and sign up for flying lessons. They would start you in a small, single-engine aircraft, and you would eventually work your way up to more complex, multi-engine aircraft. During this process, you would earn various ratings. After accumulating the necessary hours and securing the required ratings (and shelling

accepted, many VAs will require you to take basic training in their entry-level aircraft (see Figure 3). Training varies from one VA to another. If you are looking to increase your knowledge of and appreciation for flying, I highly recommend you select a VA with the most realistic training program possible. A few VAs, including the one I fly for, offer training programs crafted by real-world certified flight instructors (CFIs). Some even go so far as to provide downloadable, custom-designed training center scenery and training adventure files! Our training file introduces some "hairy" weather conditions that make for quite a landing challenge.

Much of what you learn in a virtual training program will mirror what you would learn in a non-virtual program. The more realistic the program, the better. If you survive the training exercises and return the training aircraft in the same condition you received it (wheels round on all sides, no scratches on the bottom, wings attached and props unbent), you are issued virtual wings and your career begins. Congratulations and welcome aboard! An important caveat for those who may be wondering: there is no charge to fly for any of the VAs with which I'm familiar. Even the virtual avgas is free!

Okay, back to the real world for a moment. When you fly for an airline, you fly aircraft painted in your airline's colors. In the virtual world, each VA offers a livery of aircraft—ranging from small turboprops all the way up to heavies like the Boeing 747 and 777—painted in its unique colors (see Figure 4). When choosing a VA, I recommend you not only consider the fancy paint job of the fleet, but also how well each aircraft actually flies. Better VAs offer both an attractive color scheme and highly accurate flight models of every aircraft in their fleet. Some VAs also provide you with an operating handbook (POH) for each aircraft. In case you are wondering, VA aircraft can be downloaded, free of charge, from each VA's respective web site. The process is not complicated nor is the process of loading those aircraft into your Flight Simulator program. Most aircraft come with README.TXT files that walk you through the process. Some VAs, including ours, offer self-installing aircraft files for maximum pilot convenience. This is a real plus.

In the real world, commercial airlines fly pre-determined regional, domestic and/or international routes. Larger airlines fly to destinations throughout the world using a wide variety of aircraft, while smaller airlines may fly only regional or domestic routes with a limited fleet. It goes without saying that the types of aircraft each airline flies is determined by the nature of the routes they fly. The same applies to the virtual world. Some VAs concentrate solely on regional or domestic routes with few aircraft types, while others maintain diverse fleets of aircraft that fly a multitude of routes to destinations throughout the entire virtual world. When looking for a VA, consider the type of flying you most enjoy (short hops, long hauls or a

Virtual Airline Internet Resource Guide

There are hundreds of great and not-so-great web sites containing Flight Sim and Virtual Airline-related content on the 'net. Here are just a few of the better web sites that I recommend to all flight simmers—especially those who fly for a virtual airline—to enhance their virtual flying experience. Enjoy!

Virtual Airline Listings/Links:

Here are a few places to go if you're interested in flying for a virtual airline. It's easier to provide on-line resources containing direct links to the 100+ VAs on the 'net than it is to list URLs for all of them here. Good hunting!

VADU Active VA Listing: http://www.vadu.com/vai/active_va.htm

Virtual Airline Directory: <http://www.va-home.com/vad/>

MicroWINGS VA Directory: <http://www.microwings.com/CoolWebs.HTML#VA>

Guide To FS (Virtual Airlines): <http://www.wgguide.com.au/fs/fsairlin.htm>

Yahoo (Virtual Airlines): http://www.yahoo.com/Recreation/Games/Computer_Games/Genres/Simulation/Flight/Virtual_Airlines/Airlines/

Lycos (Virtual Airlines): <http://www.lycos.com/cgi-bin/pursuit?query=virtual+airlines&matchmode=and&cat=lycos&x=29&y=13>

VA News and Information:

Virtual Airlines have become so popular that news services were developed to track the "latest and greatest" happenings at many. These are a great way to keep abreast of what is happening in the VA industry.

Virtual Airlines News Flash: <http://virtualairlines.com/vanf/printedition.htm>

This on-line virtual airline news service has been around the longest. It includes on-line print edition (updated daily), plus Real Audio™ daily news updates and weekly shows! Also contains an archive of past Virtual Airline news stories.

Virtual Airline World News: <http://www.va-home.com/vaw/>

Very comprehensive and up-to-date news service. Very well done.

Virtual Pilot Publishing News Service: <http://www.vpmag.com/news/index.html>

Another site with up-to-date virtual airline and Flight Sim-related news content.

Virtual Airlines Press Service (VAPS): http://www.vadu.com/vaps/vaps_now.htm

A real-time industry news press service. Non-edited, from VA spokespersons' mouths to your eyes. Good archive section.

Free add-on Panels:

If you're going to fly the advanced aircraft in any VA's fleet, you're going to need better panels than the default ones in Flight Simulator.

Eric's Freeware Panels: <http://www.flightsim.com/efpanels/>

Eric Ernst, a real-world commercial pilot, is arguably one of the best panel designers out there today. Download his panels free from this web site.

Navigation Software:

If you'd like to navigate with greater ease and accuracy, you should consider using a GPS and/or flight planning software. There are several programs out there. Here are a few.

Chris Brett's EFIS: <http://www.formulate.clara.net/>

EFIS is the original moving map system for glass cockpit, like those in newer Airbus and Boeing aircraft. Download his shareware EFIS here.

Super Flight Planner: <http://members.tripod.com/~theflyguy/sfl/sfl.htm>

Still in beta (for free download), this powerful and versatile Windows 95/98/NT application visually displays nav aids and flight plans for use with Flight Simulator 95 and 98. It also allows creation of great ATC adventures in a snap.

Flight Director 98: <http://www.flight1.com>

Excellent flight planning and weather generation utility.

Moving Map: <http://www.bit.net.au/~johnh/mmap>

Moving map display/navigation system for FS 98.

CoPilot: <http://www.abacuspublish.com/>

Navigation and GPS program for FS 95 and FS 98, by Abacus.

ProFlight 98: <http://www.simpilot.com>

Flight planner, navigational computer and adventure generator, by AETI.

Airport & Navigation Data/Information:

Here are real-world navigation resources that will help you get where you want to go in the virtual world.

AirNav: <http://www.airnav.com/>

AirNav provides free access to detailed aeronautical information on airports and navigational aids in the USA. It offers fast database searches, allowing the pilot to retrieve information that may assist in flight planning. If you need to find an airport or navigational aids such as a VOR or NDB, this site is extremely helpful. More importantly, you can search for an airport and the site will provide comprehensive detail on the airport—such as runway lengths, ILS frequencies, navigational aids nearby, and even a diagram in some cases. Bookmark this site and you'll use it often.

How Far Is It?: <http://www.indo.com/distance/>

This site allows you to plug in "From" and "To" information to determine the distance from one point to another. It also provides you with specific latitude/longitude and elevation information that can be used with GPS and other navigation tools.

Weather:

Those serious about flight simming like to fly in weather conditions other than the default Flight Sim weather. Below are three weather-related links. The first two provide weather conditions that you can



manually plug into your Flight Sim's weather dialog. The third is a freeware software program that actually will import real-world weather condition data into your sim.

Aviation Weather Center: http://www.awc-kc.noaa.gov/awc/Aviation_Weather_Center.html

Aviation weather galore, including winds aloft forecasts, National Weather Service information, AIRMETS and SIGMETs.

NOAA's National Weather Service: <http://weather.noaa.gov/weather/ccus.html>

Very detailed weather information for your flight planning. Searchable by region and specific areas. The server is a bit slow (government web site), but it's worth the wait.

Real Weather 5.0: <http://www.avsim.com/mike/weather/index.html>

This freeware program allows you to use weather data downloaded from the Internet in your actual Flight Simulator flights. The program will work in FS98 and FS6.0, and it is a Windows 95-based program.

Flying With Real-time ATC: If you want to enhance your virtual flying hundred fold, you absolutely must check out the following links. The programs below are hugely responsible for the continued growth and success of the VA industry.

Squawk-Box: <http://www.flash.net/~n5pyk/sb/dl.html>

This outstanding Flight Sim (freeware) add-on software program enables you to receive real-time air traffic control for the entire duration of your flight. Now you can communicate with ATC—live—just like in the non-virtual world.

Pro Controller: <http://www.netxn.com/~jgrooms/atc/index.html>

If you'd rather do the flight directing than the flying, this is the program that will enable you to direct other aircraft in the virtual skies. Now you can be a virtual Ground, Tower, TRACON and/or Center controller!

Simulated ATC Organization (SATCO): <http://www.satco.org/>

The official organization of "virtual" air traffic controllers (many of whom are real-world air traffic controllers) will direct you through all phases of your Squawk Box flight—from push back to shut down. They will provide clearance, vectors and even put you on SIDs and STARs! These are the guys on the Pro Controller end of things.

Sites with Great Links Pages:

A few additional sites contain links to all kinds of flight sim-related sites.

VADU: <http://www.vadu.com/>

A full service FBO of the VA industry, they provide flight sim enthusiasts useful information in a way that allows them to get the most out of their experiences. Lots of links.

Pre-Flight Checklist: <http://www.geocities.com/TimesSquare/Arcade/6721/links.html>

Mike's Flight Sim Homepage: <http://www.geocities.com/CapeCanaveral/7090/>

Essential Web Sites:

The following web sites contain more information related to flight simming that you can view in a single sitting. Bookmark and surf all of them. They are outstanding resources.

Avsim.com: <http://www.avsim.com/>

Flight Sim and industry news, product reviews, free downloads, on-line surveys, links to some of the very best flight sim sights, flight simmers guides, help files and tutorials, patches and fixes, a listing of many VAs, and much, much more. Plan to spend considerable time surfing the site, and loving every minute of it.

Flightsim.com: <http://www.flightsim.com>

Another "must visit" site. This site has been built over several years and is jam packed with everything related to simming, much like the Avsim sight. It also hosts on-line forms for many of the virtual airlines, which makes it unique.

MicroWINGS: <http://www.microwings.com/>

Web site of the International Association for Aerospace Simulations. Great links and downloads. They also host an actual Flight Sim Conference (yes, with speakers, exhibits and exciting excursions) once a year. Great supporters of the flight sim community.

Wings.ark: <http://www.wings.ark.com>

This web site has a very well organized collection of scenery, aircraft, panels and utilities for all versions of MS Flight Simulator.

Real-World Flying Web Sites: If you want to fly more realistically in the virtual world, spend some time learning about flying in the non-virtual world. The sites below are great resources and are highly recommended.

Landings: <http://www.landings.com/>

Everything aviation. Chat rooms, weather, aviation news, flight planning, special interest, and much, much more.

Yahoo Aviation: <http://www.yahoo.com/Recreation/Aviation/>

The ultimate search engine for everything aviation, and then some.

The Aviation Home Page: <http://www.avhome.com/>

This all-encompassing aviation site even contains a section on flight simulation and a comprehensive list of Virtual Airlines! Very well done.

Aircraft Owners & Pilots Association (AOPA): <http://www.aopa.org/>

Good resource and very worthwhile organization. They promote and protect general aviation and publish *AOPA Pilot* magazine (which I'm partial to). An organization worth joining.

Experimental Aircraft Association (EAA): <http://www.eaa.org/>

Web site of the folks who host the Oshkosh Airshow every year (Fun times!) and publish *Sport Aviation* magazine. Great folks and another organization worth joining.

"Be-A-Pilot" Web Site: <http://www.beapilot.com>

The official web site of GA Team 2000's "Stop dreaming / Start flying! Be A Pilot" campaign to boost general aviation student pilot starts. You'll find all kinds of information about learning to fly here. Most exciting, you can download a coupon for an introductory flight (in the left seat of non-virtual aircraft folks) at an airport near you for only \$35. Try it, you'll love it!

Routes To Asia & The Pacific:					
7	3690	ORD	Auckland	AKL	7
7	3692	ORD	Bangkok	BKK	7
7	3694	ORD	Hong Kong	HKG	7
7	3696	ORD	Manila	MNL	7
7	3698	ORD	Melbourne	MLB	7
7	3699	ORD	Osaka	OSA	7
7	3692	ORD	Seoul	SEL	7
7	3694	ORD	Singapore	SIN	7
7	3696	ORD	Sydney	SYD	7
7	3698	ORD	Taipei	TPE	7
7	3690	ORD	Tokyo	NRT	7

Routes To The Caribbean, Central & South America:					
7	3904	ORD	Acapulco	ACA	7
7	3906	ORD	Bermuda	BDA	7

Figure 5
VAs with small fleets concentrating on regional routes can be as fun to fly as larger VAs with diverse fleets flying a full-blown assortment of routes.

combination) and the type of aircraft you like to fly. VAs with small fleets concentrating on regional routes can be every bit as fun to fly for as larger VAs with diverse fleets flying a full-blown assortment of routes (see Figure 5). I even know of one VA that flies only classic (vintage) airliners. It is a matter of personal taste.

One area of confusion that should be clarified for those unfamiliar with the VA concept is *where* the flying actually takes place. VA web sites are similar to FBOs at your local airport. This is "home base" where you come to sign up, check out (or download) aircraft, scenery, adventure files and other add-ons (see Figure 6). In addition, training materials, POHs, etc. can be read and printed from the web site. You can also communicate with other members of the VA from the web site. Some VA sites offer bulletin boards or forums for

their members. All flying is done using a flight simulator program (99.9% are of the Microsoft variety). To be clear, you *don't* fly from within the web site of a VA. The flight sim software you are using at home determines the world in which you fly (see Figure 7).

A few words about career advancement: In the real world, most entry-level pilots flying twin turbos want to rapidly log as many hours as they can in order to advance to aircraft of more substance, which promise greater challenge and a far more attractive salary for the pilot. Career advancement in most VAs works much the same way. You begin your career in smaller aircraft, build hours (which you should log in your Flight Sim logbook) and advance in aircraft type-ratings over time. Most VAs require you to report your hours to management on regular intervals. This is usually done via an on-line PIREP (pilot report) form at your VA's web site or by e-mail. Most VAs have an "honor system" for flight time reporting. A few require you to submit your Flight Sim logbook from time to time. As you accumulate hours, you are promoted in aircraft type and gain increased bragging rights. Sorry to say, however, that in the virtual world, salaries are the same for small turboprops as they are for triple sevens: zip, nada, zero. But consider the bright side—you didn't need to spend tens of thousands of dollars for flight training and you don't need to wear those polyester uniforms.

Selecting a VA is an important decision. Please take time to look at many VAs before signing on with one. Download and test fly various aircraft from at least a few VAs to see if they fly as well as they look. Look critically at the management team of a VA—is it well organized? Do the managers seem knowledgeable? Consider the longevity of the airline. Many VAs disappear as fast as they appear, which is a real frustration for pilots who then have to sign on with another VA and, in many cases, begin their careers at the bottom again. Take a good look at the training program, the route structure and the minimum requirements to maintain active pilot status. Are they to your liking? Also, look critically at the web site of any VA you are considering. Look for depth and organization of content. Does the site offer interesting and informative information? Does it offer a "pilot help" section? Has it

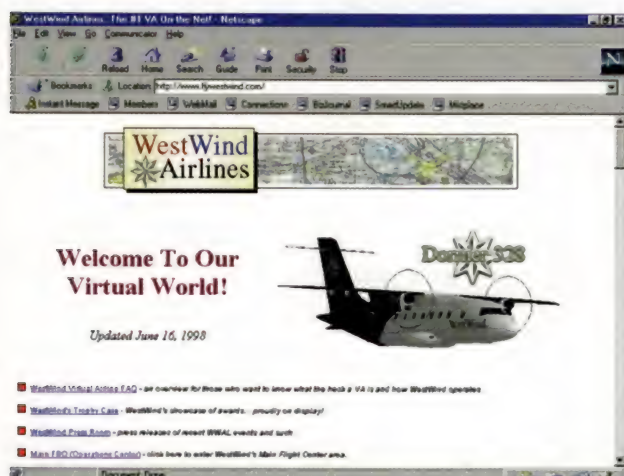


Figure 6
VA web sites are similar to FBOs at your local airport. This is "home base" where you come to sign up, check out (or download) aircraft, scenery, adventure files and more.

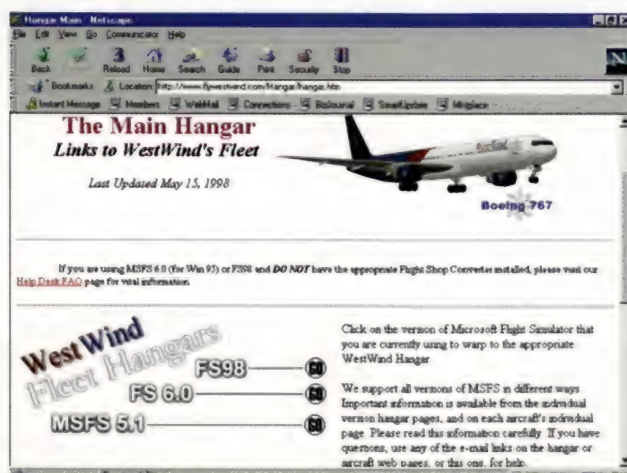
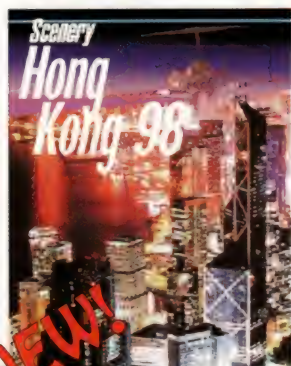


Figure 7
All flying is done using a flight simulator program (99.9% are of the Microsoft variety). You don't fly from within the web site of a VA. The flight sim software you are using at home determines the world in which you fly.

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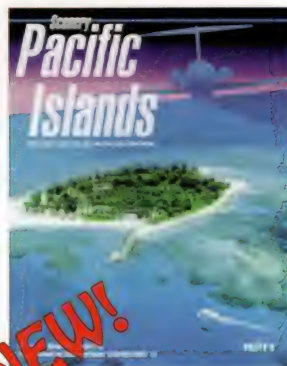
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been updated recently or is the content dated? Does the site contain a pilot and/or visitor comments page? If it does, what are people saying there? Does the VA promote and support real-world aviation? Ours is a proud sponsor of *GA Team 2000's* "Stop Dreaming/Start Flying" campaign to increase real-world general aviation pilot starts. Has the site and/or airline received any awards, and if so, for what and by whom? Flight sim magazines—like this one—are also great resources to consider. Has the VA received favorable press? Does the VA offer specialty divisions, such as a Cargo or Charter Division? Does the VA host special events, such as fly-ins? While you might not want to choose one VA over another for any single item mentioned above, you should consider the bigger picture—a combination of the above—as an indicator of how well run and stable a VA is, and how seriously the management team takes their operation. Just because it is a virtual operation doesn't mean it shouldn't be a professional one.

If you would like to do more than just fly for a virtual airline, accumulate some hours and experience with your VA and then inquire about a management position within the organization. The single most important ingredient of any successful virtual airline, large or small, is its management team. It takes more than a few talented people to run a successful virtual airline. It takes many people, all working in sync, towards a common goal. A virtual airline is only as good as the sum of its leaders. VAs are *always* in need of creative and talented individuals to fill positions as hub managers, aircraft and scenery designers, personnel directors, route creators, training directors, special project directors, web designers and others. Though the pay isn't great, "virtually nothing," in fact, a management career in a virtual airline can be highly gratifying.

Perhaps the most enjoyable thing I have found about flying for a virtual airline is the creativity and camaraderie that exists between our members—and the flight sim community as a whole. While our airmen come from literally all over the world, are of

different ages, cultural backgrounds, etc., we all have one thing very much in common: a *passion* for flying, be it simulated, real-world or both. The sense of community that exists within the structure of a successful virtual airline, coupled with the common interest we share, is second-to-none. I invite all *Full Throttle* readers to visit our VA's web site and the web sites of other VAs and have a look around. Consider a career with a virtual airline—it's a blast!



Creating A Virtual Airline

**By Randy Whistler-
Executive Director,
Central States
Airlines**

Many people dream of being a pilot, but only a few earn the privilege. But with the invention of the personal computer (PC) and the plethora of flight simulator programs available, almost anyone can enjoy flying, at least virtually. Cyberpilots have been flying the virtual skies since the release of the first Flight Simulator for the early Apple computers. Each year the hardware becomes more powerful, and with each new FS release the programs get bigger and better, allowing more realism and improved aircraft. Software developers continue to write new programs to create new scenery areas, build our favorite planes and utilize the Flight Management Systems (FMS) and Global Positioning Satellites (GPS). But other than self-satisfaction, there was no purpose to virtual flying. Then an enterprising simmer came up with the idea of the Virtual Airline (VA).

The concept of VAs is simple. We wish to create a process where simmers of all types and interests can come together in an organized fashion to increase their skills and become more proficient. A VA provides all these things, but what does it take to create a virtual airline? Where do you get the information you need? What's it all about?

Developing the Concept

Creating a virtual airline can be a daunting task involving many decisions. What area will it serve, what kind of service will it provide, and what aircraft will be flown? These are only a few of the many questions that must be answered. But the first question you should ask is "Why do you want to open a VA?" Is it because you want to be the owner of an airline? Is it because you want to be popular? The most important reason to open and operate a VA is because you want to. No other reason will motivate you or keep you interested. If you don't want to do it for yourself and commit the necessary time, then the airline will not survive. Running a VA will take a serious commitment of both time and effort. As the CEO, you will have to develop the entire concept of the airline. You'll have to set the tone, determine where to operate, choose what to fly, and decide on every other little thing that comes with the industry.

Staffing the Airline

Additionally, you also have to become a personnel director, handling the hiring of staff members such as Hub Commanders (HCs). Candidates are out there, but not

everyone is cut out to be an HC. Hub Commanders have to be motivated to perform the job asked of them. This means they have to share the CEO's vision of the airline, and be willing to put in the time and effort needed to make the airline run smoothly.

An HC will probably have to maintain pilot logs and records, and receive flight bids and pilot reports (PIREPS). The HC may also be asked to review and maintain the routes and schedules for your hub. This could easily require three to six hours a week at a medium-sized hub. Larger hubs or airlines will require more hours.

You will not know most of the pilots who will apply to your airline. The FAA doesn't govern the virtual industry, so you have no idea whether an applicant is actually a 10,000 hours ATP for TWA or a 15-year-old high school freshman. You'll have to trust that no pilot will crash your primary transports. (Fortunately, aircraft repair and replacement are very inexpensive for VAs.)

Each airline has different requirements for pilots, but one common requirement is that the pilot fly! Many pilots will apply to join the airline, but will not fly or not follow the guidelines set by the airline. Every so often you have to clean out the unresponsive pilots to allow more room for pilots who are willing to fly. Limiting your airline or hub to a specific number of pilots will allow you to concentrate on getting good pilots onboard the airline without being swamped with paperwork or problems.

Choosing the Routes

You should also consider the airline's routing and scenery. It's nice to develop an airline that flies out of Eastern Yahoo County, but if you are

An HC will probably have to maintain pilot logs and records, and receive flight bids and pilot reports (PIREPS).

the only one with that scenery, it doesn't do much good! Most successful airlines utilize the default sceneries available inside the FS programs. This allows pilots who are just beginning to fly the routes as needed. It also allows veterans to enhance their enjoyment by adding third-party sceneries as needed or desired. These additional sceneries are readily available from many popular sites on the 'net, which you can link to from the VA web site. Obtaining new scenery won't be a major task for any experienced FS pilot. The enhanced third-party sceneries are well worth the effort in most cases, since it will present the pilot with realistic airport taxiways, buildings and gates, plus dynamic scenery in many cases. The added enjoyment of flying into a detailed airport is well worth the extra effort it takes to set one up.

Selecting the Aircraft

Now that we've hired our staff, decided where to fly, and obtained the scenery for that area, what plane(s) are you going to fly? Aircraft are available in all shapes and sizes from the internet and software stores. You'll have to decide what types of aircraft to fly, from the smaller single-engine planes to the big jets. Many veteran pilots are perfectly happy flying the smaller planes regularly, while others prefer flying only the big jets. You'll have to make the decision, but providing a large selection of aircraft for your pilots will enable them to fly what they want, which will make them hang around your airline.

Many talented designers are busily churning out the latest and greatest aircraft for us to fly, and most are ready and willing to share their creations with the world. But how do you get them painted in your VA's livery? In some instances, the plane's designer will provide the source files needed for repainting by you or someone who is painting for you. Some won't release the files, but will repaint them for you. Others will not release or repaint them at all. As the CEO, you will have to take the time to find the right resources.

Setting up the Airline

Many steps must be completed before you even think about advertising for pilots. These could be done in most any order, but the one thing I've learned in the last two years is that you *must* have everything ready to go. The pilots won't accept anything less, and you won't be happy with the airline if you don't make the extra effort to make it right.

To help digest this information, let's set up our airline. I'm not going into great detail, but I will cover the high spots, and you can fill in the details as we go along.

Question One: How real is it?

We must now decide whether we are going to duplicate the operations of an existing, prototype airline or if we will choose a different angle. Realism is nice, but has drawbacks associated with pilots' skill levels and their willingness to follow the rules exactly. Operations that are "just for fun" can be simpler and looser, but many pilots who choose to fly for a VA want the extra realism that a VA provides to simming. Our fantasy airline will be a mixture of the two. We'll follow prototypical airline methods of routing, scheduling and, to a certain extent, fleet selection. We will, however, make it easy to join and create an upgrade procedure that is simple to follow without being ATP certified.

Question Two: From where are we going to fly?

You have many choices. Do we fly from the big airports, like the other VAs, or do we strike out on our own? Do we fly from the coast inland or from inland to the coast? Or do we just fly inland? If we fly from the big cities, we compete for attention with every other airline based out of that location. If we choose an obscure location, we may never get noticed. Our fantasy VA will once again go right down the middle of the runway. We'll choose St. Louis, Missouri as our primary hub. It's a large airport with a variety of traffic and runways, plus it's in the middle of the country, making for reasonable flight lengths. For the sake of this article,



Aircraft should be assigned according to the route, time of day, length of flight and number of virtual passengers, among other things

we'll also assume that it is far enough off the beaten path that you won't be fighting with dozens of other airlines.

Question Three: What aircraft are we going to fly?

We know that no real money is spent buying aircraft, getting them painted or maintaining them in a virtual world. However, that's no reason to get carried away with your fleet. If you consider your routing carefully, choosing the aircraft you fly will





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be simple. It would be silly to fly a B747 out of Meigs Field and land it at Midway! We'll assume our routes will be approximately one hour to one-and-a-half hours in length. The B737s fit this bill nicely, so we'll choose one of the most popular airliners ever produced, plus we'll throw in the Embrae Brasilia for turbo flights and a Cessna C208 Caravan for the single-engine flights. This allows a variety of aircraft for the pilots to fly along the different routes. Aircraft should be assigned according to the route, time of day, length of flight and number of virtual passengers, among other things.

Question: Where are we going to put our pages?

You're also going to need a webmaster to maintain your VA's homepages and a computer to host the site. This is a hard one. Many ISPs will provide server space to create and house your pages for your monthly fee, but they sometimes limit your storage space to a few Megs at best. Alternatives such as GEOCITIES and XOOM.COM provide free web server space. Once we find our server,

For More Information

You can contact Randy through his VA, Central States Airlines International, at <http://virtualairlines.com/airlines/cs/> or via e-mail: whistler@satco.org.

we can begin creating our pages. Creating the pages can take some time and is a never-ending process. Continually updating the pages will keep the airline looking fresh and keep the pilots interested, plus be attractive to visitors and potential employees.

OK, what do we have to this point? Well, we're going to operate somewhat realistically, but make it easy for people to join and learn. We'll operate out of KSTL for our hub and fly three different aircraft, and we're going to locate our web pages on the XYZ server. Now what? Well, one of the next things we should do now is find our core staff. We're not a large airline to begin, so we'll probably need a Hub Commander for KSTL. Someone will need to accept and process applications and work with the pilots. And perhaps a third person will maintain the website. These jobs could be consolidated into fewer people. Numbers aren't as important as who gets the jobs done. Keep the time commitments mentioned above in mind when choosing your staff.

Finding Your Pilots

Now that we have chosen our airport, set our method of operation, decided upon our fleet, written and uploaded our pages to our server space, and enlisted our core staff, it's time to go shopping for pilots. Finding pilots is easy. Finding pilots who will participate actively is hard. As the saying (somewhat paraphrased) goes, "You'll hire a lot of frogs before you find your pilots." There are many ways to find pilots, and utilizing them all will increase your chances of finding pilots who will stick with you. Mailing lists for simmers and the various simulated aviation sites on the 'net are good places to begin advertising for pilots.

After you line up your fliers, you're ready to open up and start flying! Keep in mind that running a VA is not a static process, but must be dynamic and able to change when needed. Your flexibility will ensure you can keep your pilots' interest while still providing the services required from a successful airline. You'll need to stay on top of things, so don't just set it up and run off to vacation! It's quite like a child: you nurture and guide it while it's growing, and if you've done your job, it'll grow into something to be proud of!

Conclusion

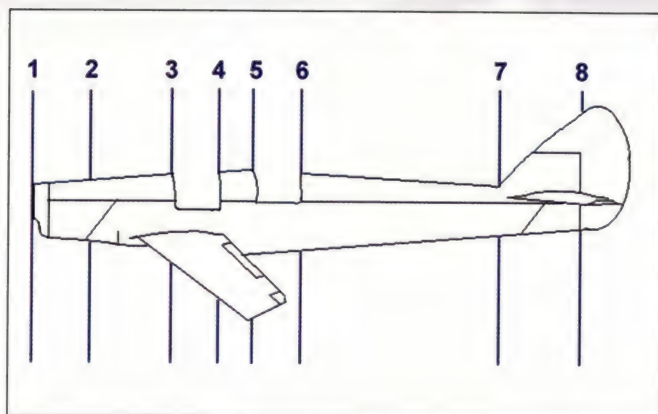
I hope I've given you a little bit to think about. Running a VA is fun, exciting, challenging, rewarding, aggravating and frustrating all at the same time. This isn't a complete and final listing of the information you'll need. Chatting with people running other VAs will be one of your best sources for help and information. I hope I've interested you in the virtual airline industry and that you'll be joining us soon in the virtual skies!

Design Forum

Homebuilder's Corner

By David Lewis

As previewed in the last issue, today we'll use the Flight Shop program to build the fuselage of your Tiger Moth. Let's start by learning how to divide the fuselage into pieces.



Referring to the drawing, the engine starts from line 1. It's a complex shape, and we can save it for a while. The engine has to be created separately from the rest of the fuselage to achieve that distinctive join between the engine cowling and the body. The next few sections are also divided up for the sake of glue. The cockpit sections will need bulkheads fore and aft to make them look solid. Finally, we'll build the simple section between 6 and 7 and the tail. The tail is separated to allow it to go into a separate assembly group and to make the gluing with the rudder and tailplanes easier.

When it comes time to paint the fuselage, the length of 1 to 7 is close to four times the height, which will make two bitmaps very nicely. Unfortunately, the exact halfway point is between 5 and 6. We could divide again, but it will be easier to stretch one bitmap a bit more than the other. My inclination is to draw the line at 6, since the forward section will be busier and more interesting all by itself.

This is quite a different approach from other two-seat, open-cockpit planes I've seen. Most (like Mike Hill's lovely Hawker Hart) make the fuselage as one or more structures, with

the panels at front and rear of the open cockpits not quite vertical. That works. The only drawback to using this approach for the Tiger Moth is that you can't have sharp corners on the side panels (but it's fine for the rounded shape of the Hart). Also, the line of the widest portion of the fuselage moves up and down along the side, which I want to avoid.

So, let's start with the easiest piece, and build the section from 6 to 7. As described last issue, this is best done as a component. Measure up the side and top views for dimensions. By my measurement, the front

(at line 6) ranges from +3.7 to -1.1 high, and is +/- 1.1 from side to side. At 7 that has been reduced to +0.6 / -1.1 high and 0.5 wide.

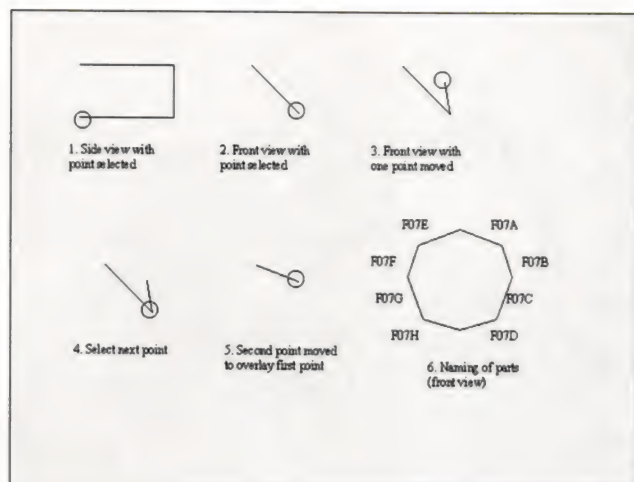
Start with the top-left polygon. After clicking **Create...** | **Data sheet**, enter the following points:

```
0, -3.7, 1.3
-1.1, -3.7, 0
-0.5, -12.1, 0
0, -12.1, 0.6
```

Save that as part FXXX. Now switch to a front view, and move the lower pair of points upward and in toward the center to give the correct upper curve. Save the result as F07A. Open FXXX for rework, and move the upper pair of points to the same place. Save the result as F07B. Repeat the process for the lower half to create F07C and F07D.

Now open each part F07A to F07D, and use the point editor to create a mirror image with positive right/left values instead of negative ones. Save them as F07E to F07H. The diagram on the top of the next page should help you visualize what I mean.

That's one whole section done. The same technique will do for the piece from 4 to 5. I intend to ignore the slope down into the rear cockpit and treat the top of that piece as flat. Save the parts there as F05A-H. By the way, I measure that area as -0.6 to -2.1 fore to aft, +1.5 to -2.1 high and +/- 1.1 from side to side.



slope, I've called the parts F03I-L. The two side parts are triangles, while the base parts are still four-sided.

At this point I should mention that four-sided shapes are not ideal for building planes. The problem is that they are hardly ever perfectly flat, which leads to disappearance problems unless they are done carefully (and the creator is a bit lucky). One reason that Aircraft Factory

bulkhead shapes are so regular is that it allows four-sided shapes to be used safely. However, I think we'll get away with it this time.

Next is the engine itself. I've decided to do this in two stages, starting with the cowling up to the front of the engine block (the solid line behind the propeller). This is straightforward along the top, but the lower part is an odd shape. I have one part with the following corners:

- 1.1, 2.6, 0
- 1.0, 3.6, -1.6
- 0.7, 5.4, -1.5
- 0.8, 5.4, 0.2

This decidedly irregular shape may look better when cut into two triangles. See what you think.

While you're measuring and making these parts, here's my

tip for measuring from plans: use a scanner. They've become very cheap these days, and scanned-in plans are very simple to measure. For example, load the plans for this project into a graphics program like Paint Shop Pro. Most graphic programs have a constant display of the cursor position. Just point to the corner you want measured and note where the cursor is pointing. Then you need a scale factor to convert it into feet; I measure the end-points of the wings and divide by the published wingspan. Now a simple division gives you each point precisely and quickly! (See Figure 3)

The engine block is going to be a structure. For the moment, sketch the side view freehand and save it as ENGSD with a Function of Template: Side structure (see Figure 4). Do the same thing for the top view to create a Template: Top structure called ENGTOP. If you are wondering how I got the view of the rest of the aircraft to appear, I skipped ahead to do all of the assembly work described below, then came back to make this part. This way I can select the menu item **File | Reference | Assembly | TMoth**.

Now go back and build the sections from lines 3 to 4 and from 5 to 6. These are actually easy now. They only have lower-half polygons, and all the corners are already defined: simply join the space between the existing sections in front and behind. I still called my parts F04C, D, G and H and F06C, D, G and H.

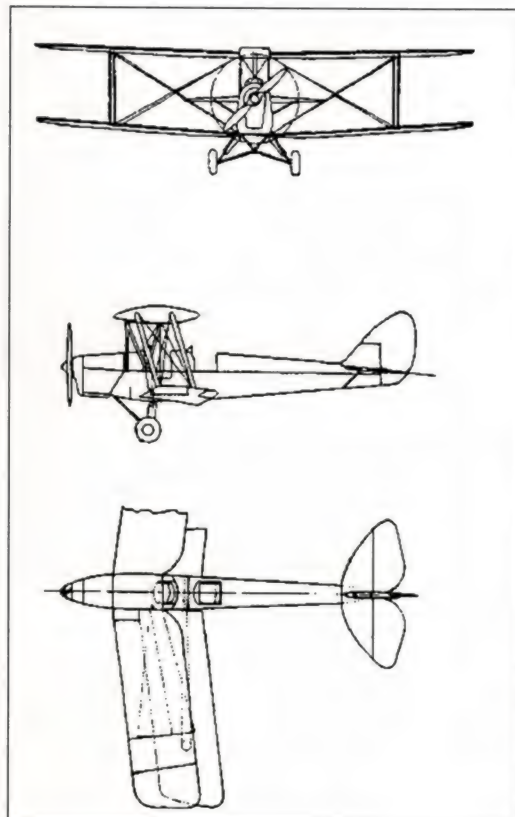
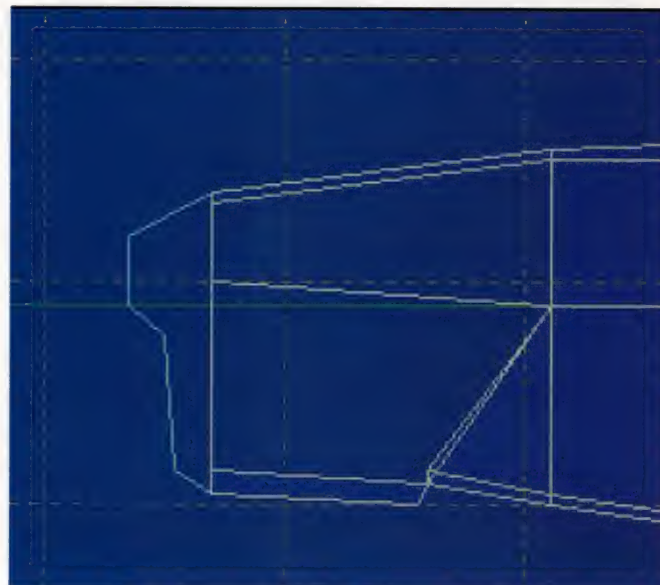


Figure 3 (left)

Figure 4 (right) Side Structure



Finally, we have the tailpiece, as far as line 8. You must decide whether to separate the tail from the rudder or to leave it all as one piece. You'll notice that the ailerons and the wings are all one piece, so why not the tail? My usual reason for making them a separate piece is that I can make the rudder turn.

This time there's another good reason; I want to make the transition from the solid fuselage to a flat sheet for the rudder. I don't want to use up the parts it would need to make a solid rudder. So, I'll build a tailpiece that ends flat. The parts will be called F08A-H, as you might expect.



Components

Next, let's combine some of those parts into components. From the main program screen, click the **Components** button to open the Components Shop. Select **Build... | Add part**. In the list of parts, click on F07A, then

hold down **(Shift)** and click on F07H. That should highlight all the F07 parts. Click the **Select & Exit** button. Choose **File... | Save As...** in the menu bar and name this collection F07, with a description of Fuselage 07. Repeat the process for each of the other groups F03, F05 and F08.

This is a good moment to go back and put bulkheads at the ends of some of the components. Go back into the Parts Shop (by clicking the **Parts Shop** button) and select **File... | Reference... | Component F03**. Now click on the top-rear point of the shape (from the side view). Change views by selecting **View... | Front**, and click on each of the other seven outside corners in turn to create a bulkhead part. Save this as F03M.

Repeat this process for F05 (front and rear, calling them F05M and F05N) and F07 (front bulkhead).

Problem planes #3: It's just like the other one!

This issue's problem is what to do when you have no idea how to split a plane into parts, how to put them in assembly groups, or how to glue them.

There is a good chance that someone else has already solved your problem. So, you search through all the .AFX files you can get your hands on for a similar plane. What do I mean by similar? Well, if you're trying to build a Cessna 421B Golden Eagle, then another model of Cessna 421 is obviously very close. Presumably, though, if someone had already built one, then you would be flying it rather than building your own. So, spread the net a little wider. The Beech Baron would present the same gluing problems: both aircraft are low-wing twin props. We know where to find one of those!

But the Baron is still a very obvious choice. There are some very different aircraft that would still have to answer the same gluing problems. What about

the DC-3? It's a low-wing twin with retractable gear and a single tail, just like the Cessna, only bigger and a different shape. Similarly, take a look at a DC-9 and compare it with a Learjet. One is bigger, but both are swept-wing twinjets with T-tails, having engines mounted on the rear fuselage. How much more similar could they be?

The next challenge is to divide your aircraft into parts and find existing solutions for each part. When building a Lancaster bomber, look at any twin-tail aircraft for ideas on how to handle the tail. Look at other bombers (maybe a B-17) for ideas on how to handle gun turrets. The B-17 would also be a good source of ideas on how to handle four engines, but if you can't find one, look at a C-130 Hercules. And on the subject of the Hercules, don't the ATR airliners look very similar to the C-130?

Only a few arrangements of parts make up most aircraft, and it is the arrangement that is difficult to get right, far more so than the actual parts themselves.

If you get it wrong, the appearance is a strange view in which something you know is nearer to you (e.g., the propeller, when viewed from the front) is partly hidden by something you know should be behind it (like the wing). This is called "bleed-through," and three tools will correct it:

1. Assign parts to the appropriate assembly group.
2. Create manual glue polygons to control bleed-through within an assembly group.
3. Divide some pieces of the aircraft in two or join others into components.

The principles of "glue" were described last time, and you'll be able to practice all this on the Tiger Moth in the next issue.



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Structures

There is one structure to be created: the engine block. Select **Structures** from the main menu, then **File... | Load TOP Template** and select ENGTOP.AFP. A rather distorted version of the engine top appears on screen. Next select **File... | Load SIDE Template** and select ENGSIDE. This is overlaid over the top view.

The Bulkhead Toolkit window then pops up. Click on the arrow to drop down the list of different bulkhead types, and select the octagon. To position the bulkheads, lay the cursor over each of the corners of the lower surface on the side view. The cursor changes appearance when it's somewhere suitable for a bulkhead. Simply click when the cursor looks like a double arrow.

When the bulkheads are in place, click on **Manufacture... | Start** to create a 3-D object. Then click **File... | Save As...** and name it ENGSTRUC, with a description of "Engine block." Your structure is complete.

Assembly

Now it's time to put all the pieces together. From the main menu, click on **Assembly Line**. Then click on **View List**. In the menu bar, select **Add to Assembly... | Component**, and select Fuselage 02. Repeat the process for all the other components.



Next select **Add to Assembly... | Part**, select LLWING, and add a left-right pair, with a 4.5 degree dihedral. To see what you've done, click on **Shuttle Bus to... | Assembly Blueprint**.

Go back to the list, and add all the F04* and F06* parts to the assembly. Also, add the bulkhead parts and the engine block structure. That completes the set for this time.

Double-click on the engine block, and give it an Application Type of "Fore bulkhead." This completes the circular part where the prop is fixed on.

Now exit from the list, select **File... | Save As...**, and give your plane the name TMoth and a description of DH82A Tiger Moth.

Next, select **Options... | Assign Flight Dynamics... | From Template Library**, and select the Single Engine Prop Template, AFRECIPART. Click **File... | Save** again and then **Produce**. You should get "limited certification." When you're ready, test fly it. It will fly like a Cessna, but look like a partly built Tiger Moth. Look out for problems. We will have some cleaning up to do next time.

Congratulations on getting so far. Now exit from Aircraft Factory with a job well done.

Next time we'll assemble the remaining parts (top wings, tail, wheels, spars and rigging). I'll supply most of the parts, to save you the effort of defining them (unless you really want to), and we can focus on assembly and glue. If you have any comments on this column, please let me know. You can contact me through e-mail at davids_lewis@uk.ibm.com.



Earning Your Wings

By Jim Rhoads

Have you ever wondered what's involved in getting the sacred private pilot's certificate? In this article Jim Rhoads explains that it takes more than desire and money to become a licensed pilot. You must be willing to sacrifice time, patience and more.

The ability to fly...

I have met very few people who are not fascinated by flight and its thrill of escaping earthly bonds to become truly free. I have a little saying I tell people: I'd rather fly than eat. You may laugh, but it's not that far from true.

So, what does it take to obtain the sacred private pilot's certificate? It takes desire. If you are simply looking for a new hobby, then take up golf. You will have more money and probably spend less time learning how to do it. However, if you love the feel of mashing the throttle to the firewall and roaring down the runway until you become airborne; or the challenge of greasing on a picture-perfect crosswind landing while all your buddies hawkeye you from the ramp; or seeing the earth from a totally different perspective than the guy driving his "cage" down the highway; if you would like to travel 100+ miles per hour in a straight line with no stop signs, then the private pilot certificate is what you need.

Dedication and Commitment

How badly do you want to fly? If you have an instructor who is worth his salt, believe me, you will find out in short order.

You must be willing to sacrifice time, patience and may I have the drum roll please: MONEY.

First, you need to find out where you can achieve this goal and who will help you. Talk to pilots you may know or hang around a few local airports on your weekends and get recommendations from different people you meet. You might even be able to get a discovery flight. These are typically 25- to 30-minutes flights that introduce you to the airplane and what it feels like doing the real thing. They are usually discounted a bit. Do you want a free coupon good for \$35 towards an introductory flight? Call 1-888-BE-A-PILOT to register for a coupon.

Find an instructor with whom you feel comfortable. Again, ask around. You will be spending plenty of time with this person crammed into a tiny classroom in the air, learning new feelings and skills. Picking your instructor is probably one of the most important elements in your quest to fly. Pick a sloppy instructor and guess what it produces? Right—a sloppy pilot.

Are you medically fit? You will need to be. Student pilots, just as other pilots, must take a medical

examination by a FAA-certified medical examiner. You can begin your training prior to the medical, but you will need to have your medical before you solo. Your flight instructor can help you locate an examiner in your area.

Ground instruction

So, should ground instruction be the first priority, or should it be incorporated in the learning process? I have heard discussion in favor of both options, and I am sure that both have their pros and cons. However, your instructor will give you the advice that he finds works well with his/her students. Never the less, it is wise to pick up introductory books on flight training. One that I personally suggest is *The Student Pilots Flight Manual* written by William K. Kershner. Ground instruction deals with many elements of flight. My ground instruction was taught during the learning process. I found this method more suitable to myself rather than trying to cram it all in at once. In ground school you will learn things like what makes the aircraft fly,

...Picking your instructor is probably one of the most important elements in your quest to fly. Pick a sloppy instructor and guess what it produces? Right—a sloppy pilot...

Earning Your Wings

how VOR and NDB nav aids work, weather recognition, reading maps, and prepare for the written test.

In the cockpit

OK, you are ready to go flying. Much training is done in Cessna 150s. 150s are great little planes but they have rather small interiors. If you are a somewhat larger individual or you have a little extra money, you may consider moving up to a 172 or Piper aircraft. The 150 will darn well teach you to fly, and its operating costs are relatively inexpensive compared to other aircraft.

Typical prices in the area where I live (Great Lakes) are around \$40 to \$50 per hour "wet" (with gas) for a Cessna 150 and \$50 to \$60 wet cost for a Cessna 172. This does not include the cost of an instructor. Remember when I told you about money? Instructors in my area typically cost about \$20 an hour. Whatever you choose, make sure the plane looks like it is well maintained. Check the general appearance of the plane. Do the tires look bald? Are there oil slicks dripping from the engine cowlings? Are the radios functional and instruments working properly? More than likely they will be, but the overall condition of the airplane might very well give you a clue about the instructor as well.

Once you become familiar with the plane and get a basic understanding of how the controls work, the instructor will assist you for sometime on takeoffs and landings,

pattern procedures, stalls and basic maneuvers until he feels confident that you're ready to be kicked out of the nest.

How many hours does it take to solo? Good question. How attentive have you been? How comfortable are you with the aircraft? How proficient are you? These are questions that can only be answered by your instructor, and I will bet a dollar to a donut that he/she will not tell you. She will just stop, smile at you, open the door and say, "Take me around the pattern." That will be the longest ten minutes of your life, and you will hear every word that was ever spoken during training: "Step on the rudder," "Power to 1700 rpm," "Ten degree flaps."

Do yourself a favor: in earlier days when a pilot soloed, they cut off his shirttail, and he wrote his name, date and the airport he soloed from on it. It was considered bad luck if he didn't. I still have mine hanging in my office and am glad my instructor gave me a memento from that day.

Requirements

How many hours will it take to get a private pilot certificate? 40 hours is the minimum amount of time required for a license. These are minimum training times; few pilots achieve the necessary skill and proficiency to pass the FAA check ride in this amount of time. You can estimate a good



Cessna makes several popular planes for training new pilots, including the Cessna 150, Cessna 152 and Cessna 172.

These are three examples (top, below left and below right) of planes used in training new pilots.





average of about 70 hours to obtain a private pilot certificate. Here is the rundown.

Aeronautical Experience

You must meet the following:

- Be at least 17 years old.
- Be able to read, write and speak English.

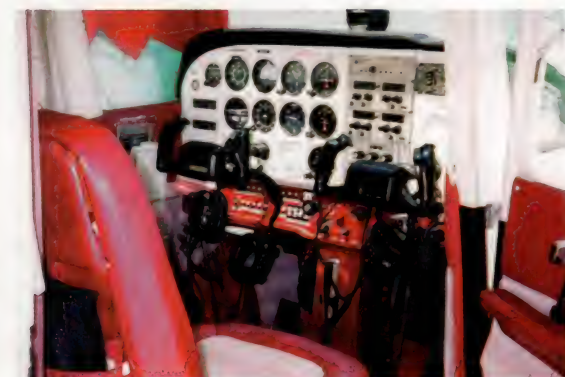
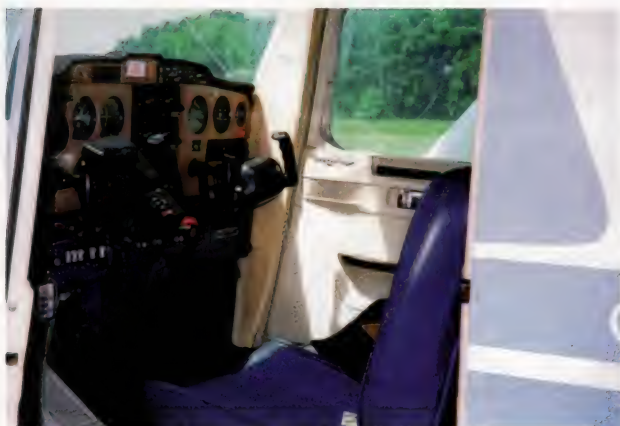


- Pass the required aeronautical knowledge test.
- Pass the required FAA medical exam.
- Have at least 40 hours of flight time, including at least 20 hours of flight training from an authorized instructor and 10 hours of solo flight training in the areas of operation listed in FAR sec. 61.107.
- Have at least three hours of cross-country flight training in a single-engine airplane or three hours of night flight training in a single-engine airplane. Either must include a cross-country flight over 100 nautical miles total distance and ten take offs and landings to a full stop, with each landing involving a flight in the traffic pattern at an airport.
- Have at least three hours of flight training in a single-engine airplane on the control and maneuvering of an airplane solely by reference to instruments. This includes straight and level flight, constant airspeed climbs and descents, turns to a heading, recovery from unusual flight attitudes, radio communications and using navigation systems/facilities and radar services appropriate to instrument flight.
- Have at least three hours of flight training in preparation for the practical test in a single-engine airplane. This must have been done within 60 days preceding the test.



Preflight planning is a requirement (top and middle pictures). You'll need to understand what makes your aircraft fly, how VOR and NDB nav aids work, weather recognition, reading maps and more.

A good source for airport information is the JeppGuide (bottom). You'll also need to understand how to use tools to chart out map courses.



- Have at least ten hours of solo flight time in a single-engine airplane. This consists of at least five hours of solo cross-country and one solo cross-country flight of at least 150 nautical miles total distance with full-stop landings at a minimum of three points. One segment of the flight must be a straight-line distance of at least 50 nautical miles between the take off and landing locations. Also, three takeoffs and landings to a full stop (with each landing involving a flight in the traffic pattern) at an airport with an operating control tower.

Aeronautical Knowledge

You need a thorough understanding of:

- Applicable Federal Aviation Regulations that relate to private pilot privileges, limitations and flight operations.
- Accident reporting requirements of the National Transportation Safety Board.

As you can see in these photos, training planes can have cramped quarters. If you're a somewhat larger individual or you have a little extra money, consider moving up to a 172 or Piper aircraft.

- Use of applicable portions of the Aeronautical Information manual and FAA advisory circulars.
- Use of aeronautical charts for VFR navigation using pilotage, dead reckoning and navigation systems.
- Radio communication procedures.
- Recognition of critical weather situations from the ground and in flight, windshear avoidance and the procurement and use of aeronautical weather reports and forecasts.
- Safe and efficient operation of aircraft, including collision avoidance and recognition and avoidance of wake turbulence.
- Effects of altitude density on takeoff and climb performance.
- Weight and balance computations.
- Principles of aerodynamics, power plants and aircraft systems.
- Stall awareness, spin entry, spins and spin recovery techniques.
- Aeronautical decision making and judgment.
- Preflight action, including how to obtain information on runway lengths at airports of intended use, data on takeoff and landing distances, weather reports and forecasts, fuel requirements, and how to plan for alternatives if the planned flight cannot be completed.

Sources: What you'll need and where to get it

- A plotter to find headings and chart out map courses
- An E6b flight computer
- Current area sectional
- Airport directory guide
- Logbook
- Checklist for the type of plane you are flying (optional)
- Flight bag to put all your stuff (optional)
- Headphones (optional)
- Lots of money (mandatory)

You can find many of these pilot supplies at Sporty's Pilot Shop. For free catalogs contact Sporty's at 1-513-735-9000 or go to the web site at www.sportys-catalogs.com/pilot/pilot.html.

You can obtain a free virtual E6b computer at internet.oit.osshe.edu/~kempaj/e6b.htm.

Flight Training magazine is a top-notch publication geared toward student pilots and instructors. Contact them at www.avweb.com/sponsors/ftmag/.

A great Internet site that introduces you to the physics of aerodynamics is located at www.monmouth.com/~jsd/fly/how/.

John Denker has done a fabulous job of explaining the basic and advanced laws and rules of flight. Check it out.

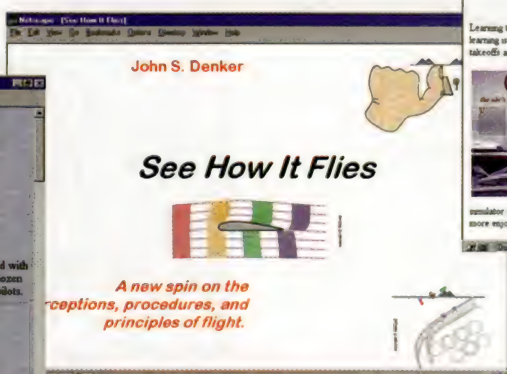
Over and out

Committing to be a FAA-certified pilot is one of the toughest things you will ever do, and absolutely one of the most rewarding. There will be times when you will swear there is no way that you will be able to understand all the information being thrown at you. They say that in the time it takes for you to obtain your ticket, you will have learned 16,000 new things. I believe it. Have you ever wondered why pilots have earned the reputation of being cocky? They have worked hard, sacrificed much, and paid a price to receive the honor of taming the air. Am I a cocky pilot? Sure I am. I am proud of what I have achieved and what has been entrusted too me. However, as proud as I am, I never forget being at the threshold of the runway and mashing the throttle to the firewall for the first time. Thinking my skin was going to crawl off me when my instructor required me to do stalls alone. Bouncing that little Cessna 150 all over the runway, until landing it correctly finally clicked. The learning process is a time that I will remember and cherish always, and don't let any cocky pilot fool you: We are all still learning.

Better ways to fly... from the ground up!



Visit <http://www.flight1.com> or your favorite vendor for details.



You can find many pilot supplies at Sporty's Pilot Shop (left). An Internet site that introduces you to the physics of aerodynamics is from John Denker (middle). *Flight Training* magazine (right) is a top-notch publication geared toward student pilots and instructors. Look for the specific web addresses in the article above.

What's New in Flight Simulation?

Full Throttle Gives You A Look At The E³ Show

By Tim Dickens

“A look into the future” is the best description of the Electronic Entertainment Exposition (E³) show at the World Congress Center in Atlanta. In this case, we are talking about the *very near* future.

From May 28th to May 30th, computer gamers, geeks and general enthusiasts were treated to the very latest technology from the electronic entertainment industry. Of course, the vast majority of the exposition was oriented toward general home entertainment. The Nintendo booth by itself was larger than the capitol building of some third world countries.



The flight simulation market has become *very* big business since Flight Simulator's humble beginnings on the Apple computer more than 15 years ago (any old timers out there remember the title *Flight Simulator* without any numbers behind it?). Just during this past year, flight sim enthusiasts have seen an explosion of software programs (simulators), add-on programs/scenery and hardware. Flight simming is no longer a choice between just one or two platforms. This explosion is growing exponentially, and exciting new additions to flight simmers' shopping baskets are just around the corner!

As participants of this gigantic electronic emporium, *Full Throttle* staff members were given a first-hand look at the very latest technology that will be visiting the shelves of your local retailers and favorite software vendors this fall. In fact, some of what you will be reading about here is available now!

New Combat Simulators

Two new treasures for combat simulator enthusiasts were prominently featured at E³: Jane's **Fighter Legends** and Microsoft's **Combat Flight Simulator**. Both have World War II themes, featuring the famous fighter aircraft of the day. When we can actually get our hands on the release copies of these new simulators, we will provide you with full, in-depth reviews and insights. But we did get a chance to sit in the pilot's seat for each of these new sims, so that we could share our feel for the cockpit with you.

Jane's Fighter Legends

Due this fall, Jane's Fighter Legends provides realistic cockpit and external views and impressive flight models. The Jane's representative that showed us the new simulator told us that Fighter Legends utilizes a new scaleable 3-D engine, supporting high polygon counts, real-time lighting, and excellent special effects, terrain and aircraft detail.



The flight models seemed quite good during our brief flight, and we were impressed by the special effects, like explosions and battle damage to the aircraft. The 3-D virtual cockpit was also very impressive. All of the cockpit controls featured working switches, knobs, etc.

Jane's Fighter Legends will include seven of the most powerful aircraft of the era, from both sides of the conflict: American P-38J, P-47D and P-51D fighters, the British Spitfire F.IX, and the German Me 109G-6, Focke-Wulf 190A-8 and Me 262A-1a fighters. It's a nice selection.

The game contains training missions and variable difficulty levels, as well as branching campaigns, a collection of actual WW II film footage and interviews with several real WW II aces.

All things considered, it looks like Jane's Fighter Legends is going to be a real hit among combat sim enthusiasts, particularly those interested in flying the vintage WW II fighters.

Microsoft's Combat Flight Simulator

Microsoft's entry into this field looks like it is going to give Jane's a run for their money. Again, we had a chance to take the controls for a close look. Although we did not have a chance to see their rendition of the virtual cockpit, the control panel looked equally impressive, again with working controls and realistic layout.

The scenery looked very similar to the renowned FS scenery engine, with the addition of digitized elevated terrain and much more realistic cloud formations. Comparing side-by-side, at this point the ground terrain looked more detailed and accurate than it did in Jane's (although both are quite excellent).

But what could really give Microsoft the advantage here is the planned compatibility with current scenery for FS 98. So, you could conceivably create your own theater of war or build your own missions based on custom-made scenery.

Microsoft will definitely have another leg up here, since there will be compatibility with FS 98 aircraft that can be converted for use with Combat Flight Simulator. The Microsoft representative told us that you

would be able to add any of your favorite aircraft through a converter, which will automatically add machine guns. Naturally, this would not make much sense with a Piper Cub, but with the variety of vintage WW II aircraft available for FS 98, this could be a very valuable feature.

The simulator will come with eight WW II aircraft: Spitfire Mk I, Hawker Hurricane Mk I, Messerschmitt Me 109 E, Messerschmitt Me 109 G, Focke Wulf Fw 190 A8, P-47D Thunderbolt, and the venerable North American P-51D Mustang.

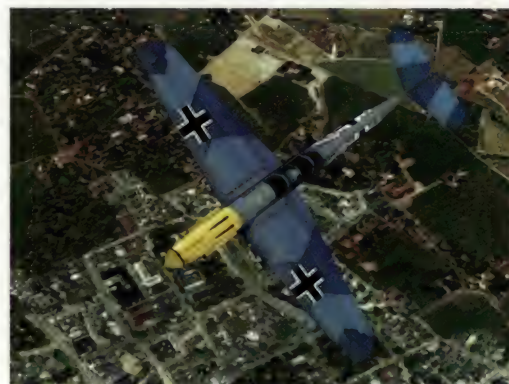
Combat Flight Simulator will offer two campaigns: The Battle of Britain (1940) and the Battle over Europe (1943-1945). There will be roughly 70 missions with a variety of combat activities, which will include random elements to make each flight unique. An artificial intelligence, based on sight modeling, is employed to make the air combat exciting and realistic. This system utilizes tactical positioning—calculating the chances of the enemy aircraft hitting you based on your relative positions. All the enemy planes are governed by the same laws of flight you are.

The aircraft damage effects are also quite impressive. Each of the planes will have dozens of damage zones, each linked to specific aircraft systems. Different types of smoke will appear, depending on where your aircraft is hit. If you inflict damage on an enemy aircraft's control system, its flight model will be affected accordingly. The damage is linked to the performance of the plane. Explosion and damage effects seemed quite realistic.

This one is definitely going to be a winner, particularly among FS 98 enthusiasts who enjoy WW II era flying.

Fly!—A New General Aviation Simulator

Coming to your virtual FBO this fall (projected release date) will be the new general aviation simulator from Terminal Reality, with the self-





If Fly! lives up to the features and specifications outlined by the designers, it will be on the hard drives of many flight sim enthusiasts.



New Flight Sim Hardware

As the flight sim software industry continues to prove itself to be a significant portion of the electronic entertainment market, the hardware industry is taking notice. New ideas and engineering are surfacing that will provide avid simmers with

more convenience and realism. Here is a sampling of the new hardware we found at the exposition.

Joystick Switchbox from CH Products

Ever been frustrated by connecting different types of joysticks or game controllers to accommodate different simulators or games? The CH Products Joystick Switchbox offers an affordable and practical solution for you.

The Joystick Switchbox allows you to connect four (or more) controllers to one computer through the standard joystick gameport. It automatically routes signals from whichever joystick or controller you are using at the time, without having to manually work switches or change cable connections. It is compatible with all standard analog controllers, such as joysticks, yokes, pedals, racing wheels and even gamepads.

descriptive name **Fly!**. A very impressive exhibit booth, featuring the shell of an actual aircraft complete with a working cockpit, showcased this newcomer to the flight simulation world.

Without a detailed, first-hand look at the entire, finished program to use on our own computers, we can not provide a detailed review of this new general aviation simulator. But if the end product lives up to the features and specifications outlined by the designers, this one is going to be on a lot of flight sim enthusiasts' hard drives!

According to the folks at Terminal Reality, Fly! will feature a global scenery world with navigation aids (including GPS), digital elevated terrain based on scaled satellite imagery (for increased ground resolution at low altitude), integrated interactive voice ATC, dynamic scenery, configurable weather systems, internet support (with live microphone activity), and native support for all types of 3-D graphics accelerators. The information from Terminal Reality also indicates that five aircraft,

including single- and twin-prop and business jet aircraft, will be included. All aircraft are to have detailed cockpit interiors following original manufacturer layout specifications with 100% working control over all aircraft functions. Fly! is being developed to work with both Windows 95/98 systems and Apple PowerPC/MacOS systems.

The Terminal Reality representative also touted the flight models of the aircraft, as expected. I did make a brief flight with their demonstration setup, and the single-engine Cessna that I flew seemed just right. Of course, a more detailed examination on our own computers with the finished product will be in order before we can truly verify this.

The bottom line here is that if this simulator's final release delivers as advertised, it's going to be serious competition for everything else on the market.



You will never need to crawl on the floor and manually change plug connections again. Users who prefer a yoke for their civilian flight sim and want to use a joystick for their combat sims will find this an invaluable add-on.

Available from
Flight-Sim Central
800-477-SIMS
<http://www.fscentral.com>
e-mail sales@fscentral.com

High-Flite
888-247-3478
e-mail sales@chsdist.com

Rock-N-Ride Moving Chair

One of the realism-limiting aspects of PC flight simulation, particularly combat simulation, is that no motion is involved in your environment. The full-blown cockpits that pitch and roll, like you find in some game arcades, deliver a sensory experience that just could not be duplicated at home—until now.

The Rock-N-Ride is the first moving simulator chair designed for home use. Pull back on your stick and the Rock-N-Ride tilts back; push forward and it tilts down. Bank left and it leans left; bank right and it rolls right. The chair does not receive input from the simulator, like a force-feedback joystick. Instead, it responds to signals from the joystick. Air cylinders (powered by a compressor) move the chair. Velcro straps hold your monitor in a tray in front of you, and a second tray holds your joystick. A footrest is built onto the chair to keep your

feet off the ground. A subwoofer mounted directly under the seat enhances the sound from the simulator.

The price tag of \$850, including air-compressor, shipping and handling, puts this innovative new idea into the reality ballpark for avid combat sim enthusiasts. It's available from Rock-N-Ride on the Internet at <http://www.rocknride.com>. You can contact them by e-mail at rocknride@hotmail.com or by phone at 760-244-1893.

Sim Hawk Simulator Control System

Another aspect of real-world flight that is hard to duplicate within the PC environment is the real tactile feel of the aircraft control systems. The Sim Hawk flight control system was designed to provide flight simmers with that aspect of reality. This sturdy, aluminum aircraft control system interfaces with FS 95/98 or the IFT Pro Instrument training software.



The flight controls include the yoke, throttle, mixture, prop pitch, magnetos, trim, flaps, gears and navigation beacons. Avionics controls include the radio controls (COM1, NAV1 + OBS, NAV2 + OBS, ADF and transponder) and the autopilot. An extremely sturdy set of rudder pedals with very realistic input-motion is also available.

The \$1,595.00 price tag for both the control system and pedals may be too steep for many MS FS users, but dedicated single-prop enthusiasts, particularly real-world pilots who maintain their proficiency in the virtual world, may find this a valuable asset. (Note: The FAA does not currently allow pilots to log

these hours). You can learn more on their website at <http://www.controlvision.com>, by e-mail at sales@controlvision.com or by phone at 1-800-292-1160.

Virtual Cockpit

The Cockpit Group, an Atlanta-based company, introduced The Virtual Cockpit at this year's exhibition. It is compatible with most popular flight simulators. The Virtual Cockpit is a six by two-and-a-half by four feet seated enclosure, into which a simmer can put his PC and accessories to enhance the realism of a cockpit environment. The user is seated in a comfortable semi-prone position with a joystick console between the knees and the monitor mounted straight ahead. Rudder pedals can be mounted underneath. An under-seat sub-woofer enhances the sound produced by the simulator.

With a price tag of \$229.00, this is a very affordable enhancement to the flight simming environment. You can find more information on their website at <http://www.vcockpit.com>, by e-mail at info@vcockpit.com or by phone at 1-800-861-7055.

Hot New Software Add-Ons

Two new software add-ons really caught our eye: the new **Flight Director 98** (which is featured in a review in this issue), from Flight1 Software, and **ProFlight 98**, from AETI.

ProFlight 98

ProFlight 98 gives FS 98 simmers the ability to create digitized voice adventures anywhere in the world via a very user-friendly program interface. Flight plans and voice adventures can be generated from a database of over 50,000 waypoints, intersections, SIDS & STARS and airport data.

The data can be extracted from the Adventure Planner and automatically loaded into a fully functional on-board Flight Management Computer (FMC). Brand-new panels for the Boeing 737, Learjet 45 and a Boeing 777-300 glass cockpit, with the FMC built in, are included with the program. You



The author takes a sample ride in the Rock'n'Ride

also get a Boeing 777-300 airliner from the "Next Generation" Professional Flight Collection as an added bonus.



The adventure program generates adventures using seven different digitized air traffic controller voices, providing commands from clearance delivery, ground control, tower, departure, arrival, ATC center, and even Flight Service. You will even be able to record your own voice for UNICOM messages or as substitutes for the ATC voices. Background ATC voice chatter is generated dynamically with several thousands different messages. An advanced artificial intelligence module even determines which traffic you hear (small aircraft, large airliners or mixed) based on airport type, size and facilities.

Weather with multiple layers of clouds, wind and visibility can be automatically generated based on the user's flight plan, with changing conditions during flight. An emergency can even be declared, giving you vectors to the nearest alternate airport.

As this article is being written, ProFlight 98 has not been released, but we had a chance to look at it briefly at the exposition, and you can expect a full review in the next issue of *Full Throttle*. I can tell you from what we saw, it is going to be a must-have for simmers who enjoy flying ATC adventures.

Find out more about ProFlight 98 from the AETI web site <http://www.simpilot.com>, e-mail at AETI@simpilot.com or by phone at 1-949-551-0372.

New Microprocessor Technology

AMD-K6®-2-3DNow! Processor Chip

The folks at AMD were kind enough to lend us a computer with their new K6®-2-3DNow! processor chip. This new chip's 3DNow! technology provides better floating point support for high-end graphics-intensive programs. Although none of the flight simulation programs currently on the market have the coding to take full advantage of 3DNow! technology, the superior speed of this chip and its socket-7 design make it very attractive for upgrading your present system.

We clocked nearly 400 MHz with this chip on the computer at our exhibit. When we ran FS 98, the frame rates around Meigs Field (with all settings on "Dense") were in the 30-40 fps range consistently—very impressive performance.

The next generation of flight simulation programs will no doubt be supporting the 3DNow! technology, which will really make this chip a valuable asset in your PC. Microsoft Corporation is supporting 3DNow! technology in DirectX 6.0, a common set of APIs (Application Programming Interfaces) for multimedia in the Windows platform.

DirectX 6.0 optimized for 3DNow! technology is expected to be available in July 1998.

We highly recommend the K6®-2-3DNow! processor chip if you are thinking of upgrading your PC or are shopping for a new system. It is the technology of the future. As far as prices go, AMD has a track record of being substantially lower in price than the competition. Consult your local computer retailer for pricing.

Conclusion

Technology is changing rapidly in the PC world, and the electronic entertainment industry is following with new advancements just as rapidly. The flight simulation part of this industry is no exception. Old timers, like me, remember the early days of MS FS, when changes in the basic structure and general advancements in the program were slow, to say the least. The days of waiting years for significant improvements and realistic enhancements, like the almost six years between FS 5 and FS 98, are behind us. New improvements in both software and hardware are happening so fast it that it is difficult for the average simmer to keep up with it. *Full Throttle* will continue to stay on top of what is new and keep you abreast of the ever-changing technology.



Virtual Flight Training: Point to Point Navigation

By David Lewis

In this edition we'll explore the development of navigation and flight planning, from the earliest days of biplanes and road maps to point-to-point navigation in the cockpit of the latest aircraft using the ADF (Automatic Direction Finder) instrument.

Along the way, we'll detour into various aspects of aviation, including charts, weather, controlled airspace and exercises for you to practice on your simulator. By the end of the journey, you should be able to find your way safely from A to B in the simulated world.

Last time we were back at the dawn of flying, in a Sopwith Camel with no radio. We made two flights around California with the aid of our eyes, a compass and a watch. I also used a map for planning the flight. This time our story has advanced to the early 1930s, with the first radio navigation aids. But before we get to that, let's consider one issue critical for flying: the weather.

Weather has many aspects but today we'll just think about clouds and wind. Clouds are made of water droplets and are difficult to see through.

They also shake your plane about but the big issue is that they hide the ground. A private pilot's license does not allow the pilot to fly through clouds without additional ratings.

In some situations, pilots are required to keep a minimum distance from any cloud. Clearly the kind of pilotage we've been doing is impossible in or above clouds, but dead reckoning would still work—until you hit another plane or a mountain you didn't

see coming! Luckily, the simulator environment is a good deal more forgiving than reality, and the skies were not so busy back in the thirties. We may take a few chances in our flights this time.

Flight #3A: Concord Buchanan to Half Moon Bay—Direct in FS 98

Start Flight Simulator. From the **World | Go To | Airport...** menu, select Buchanan Field (Concord), in the San Francisco area. Choose runway 32R. Set the time of day in the **World | Time & Season** menu to "Day." Select "Winter" as your season. This will enhance the terrain differences in this region. In the **Aircraft | Select Aircraft...** menu, choose the Sopwith Camel. Leave the weather as normal, with no winds aloft.

We will establish our course from the sectional chart for the San Francisco area. It shows that Half Moon Bay is at bearing 200 degrees from Concord/Buchanan (see the map in Figure 1).

Take off from runway 32R, and at 400 feet turn left to a heading of 200 degrees. Try to maintain this heading accurately for the entire flight. Since there is so much visual reference for this route, we won't worry about the time. Climb to 2,000 feet, and stay at that altitude across the bay.

Figure 1
The sectional chart for the San Francisco area shows that Half Moon Bay is at bearing 200 degrees from Concord/Buchanan.

You should pass the left-hand end of the Berkeley Hills, noticing the reservoirs at their base. As you fly across Oakland, look out for the International airport to your left and the Alameda naval air station to your right (see series of images on the next page starting with Figure 2).

This makes an excellent "checkpoint"—a place to check that you're still on course. A good flight plan should have regular checkpoints along the way. Take a look at the red line on the sectional chart to confirm this. You'll see why these checkpoints are so important on your next trip, with winds aloft.

Now proceed across the bay to San Francisco. As you cross the city, look out for the low, brown ridge to your right. That's San Bruno Mountain. To your left is San Francisco International airport (see Figure 3).

These days a flight like this would land you in hot water, since you'll be passing runways 28 L/R at just the right height for a departing jumbo to knock you out of the sky. Let's just say it's a good thing there were no 747s in the 1930s!





Figure 2
When you pass Berkeley Hills, notice the reservoirs at their base. Also look for the International airport to your left and the Alameda naval air station to your right as you fly across Oakland.



Figure 3
As you cross San Francisco, look for San Bruno Mountain—the low, brown ridge to your right. On your left is San Francisco International airport.



Figure 4
Notice the familiar dark green ridge. Climb to 3,000 feet and fly by the San Francisco State Fish and Game Refuge. Finally, as you cross the ridge, you'll see Half Moon Bay and the airport lights ahead.

Ahead is a familiar dark green ridge. Climb to 3,000 feet and try not to scare the locals in the San Francisco State Fish and Game Refuge. Finally, as you cross the ridge, you'll see Half Moon Bay and the airport lights ahead (see Figure 4).

Well done. Now I'd like you to do it again—this time with winds aloft!

Flight #3B: Concord Buchanan to Half Moon Bay—Direct with winds aloft

Wind is the movement of the air in a direction. If you fly on a windy day, the air takes your plane with it. To understand just how significant that can be, let's take a trip by dead reckoning with some more serious winds aloft.

This time, before you take off, set the winds at 2,000' to 20 kts from heading 270°. If you haven't altered the weather before, here's the procedure. Make sure that Advanced Weather Dialog is checked in **Options | Preferences...** Also, turn off automatic weather generation. You may need to close and restart FS 98 to make this feature active.

- From the **World** menu, select **Weather**.
- Click on the "Wind" tab.
- Click on "Add layer."
- Specify an altitude range that includes 3,000'.
- Specify a heading of 270° and speed at 20 kts.
- Leave Turbulence as "Light."
- Select wind type as "Gusting" (about 1/4 on).
- Click ☒ on each menu until you're back to flying.



Twenty knots are not excessive, but see what a difference it makes to your eventual destination!

Magnetic Variation

There are two versions of north: "true" north is the direction that most maps point upward, along lines of longitude that meet at the North Pole; and "magnetic" north, the direction the compass points. Depending on where in the world you are standing, these two are not quite the same.

California is a great place to learn about this effect, since the difference between the two is quite large there. In San Francisco, the difference (called "magnetic variation") is just over 15 degrees east: magnetic north is 15 degrees east of true north.

Most things aviation-related are based on magnetic bearings, but watch out for the few exceptions: surface wind direction, for example, is quoted in degrees true. Also, if you are planning a flight with a road map, expect the north on your map to be true north, and adjust for magnetic variation before you look at the compass in your aircraft.

If you have an aviation chart, look for lines (called "isogonals") showing the magnetic variation. They are like contour lines for variation. San Francisco lies between the 15E and 16E isogonals, so the variation there is between 15 and 16 degrees.

This is the biggest drawback with dead reckoning. If you don't have any landmarks to check your position, the wind will make you drift off course constantly. There is a solution, but it's not perfect. You have to turn into the wind a little. That way, you steer off course, but the wind pushes you back on course. This solution also slows you down, since you're pushing against the wind. So, you'll need to allow a little longer to get to each checkpoint or landmark on your route.

So, how much should you steer into the wind? Well, the calculation is messy, using sine and cosine functions. The easiest solution, if you have a computer package to create your flight plan, is to check whether it can compensate for the wind automatically. Several packages check your cruise speed and the wind speed and direction, and print a heading to fly which should keep you on course.

Otherwise, a good rule of thumb is that one degree of steering is needed for each knot relative to 60. For example, if the wind is coming from the left at 10 knots, and you are cruising at 120 kts, then the wind speed is 10/120 or 5/60 of your speed. So steer left 5 degrees. If the wind isn't coming directly from either side, but from a quarter position, then only correct half as much. If the wind is coming from straight in front or straight behind, no correction is needed.

Let's try that out. There's a 20-knot wind blowing from the right, and we're cruising at 90 kts. 20/90 is about 13/60, so that suggests a correction of

thirteen degrees. But the wind is only quarter-on, so let's call it 208 degrees. Fly the same route again and see how close it gets you. I got pretty close (see Figure 6).

It's time for a change of scene, but before we leave the subject of wind and what it does to dead reckoning, just consider that you can only allow for the effect of the wind if you know which way it's blowing and how hard. That's one reason real pilots read such detailed weather forecasts before they fly.

Another important thing to remember is that dead reckoning requires you to fly at a constant, steady speed. Go faster and you'll drift less, which is like turning into the wind. You'll also travel further in a fixed time, so you'll end up past your destination and upwind of it. That's a recipe for getting lost, or as pilots sometimes say, "unsure of your position."

The Royal Air Force trains pilots to fly at steady speeds that are multiples of 60 knots: 120, 180 or 360 in jets. This is to aid checkpoint planning, because it's an exact number of miles per minute. Given a chart and a ruler marked to the same scale (called a "plotter"), the pilot can plan the flight easily: ten miles to the railway, that'll take five minutes; then eight miles to the head of the lake, another four minutes, should be there at nine minutes after start time; two miles down the lake is one minute, now ten minutes after start time; five more miles to the target, that's two minutes 30, etc.



Figure 6





Figure 8
The ADF is located in the upper right corner of the panel. make certain the needle is pointing to about five o'clock. That shows the ADF is working and is pointing to SHARPE.



Figure 9
Apply full throttle and take off. At 400 feet, turn right until the ADF needle points straight up. Climb to 3,500' and try to hold the needle straight up.

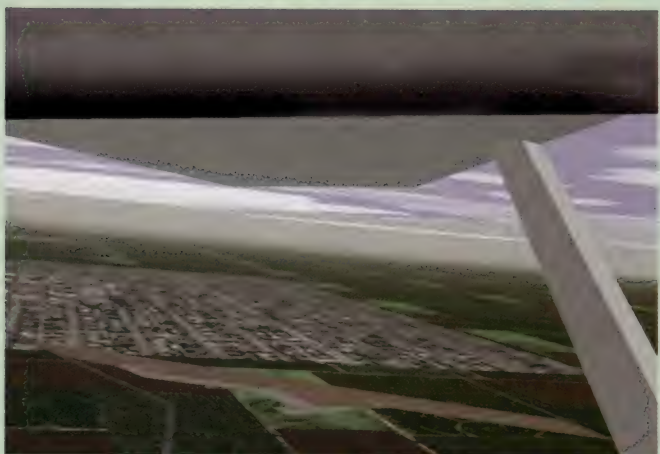


Figure 10
Fly straight for a short time and the needle should swing round to point behind you. Look out the left window to see the lights of Stockton Metro waiting to greet you at the end of this flight.

Using the ADF

Now, as promised earlier, let's take a look at the ADF (Automatic Direction Finder), or "radio compass." This first radio

navigation aid appeared in the mid-'30s. It's a very simple system to understand. A radio transmitter (or beacon) on the ground broadcasts on a published frequency. The transmission is sent in all directions at once, so this is a Non-Directional Beacon, or NDB.

A receiver in the aircraft finds the direction from which the transmitter's signal is strongest, and a needle on the instrument panel points straight at the beacon. Just as a compass points north, so the "radio compass" always points to the transmitter.

Early versions of the ADF had an aerial on the aircraft that was turned by hand, using a wheel in the cockpit, and a gauge that showed the strength of the signal from the beacon. When the gauge showed the strongest signal, the pilot noted the direction of aerial and flew that way. The modern ADF is a great improvement on those first devices.

Flight #4: Concord Buchanan to Stockton Metro.

Start the simulator. From the **World | Go To | Airport...** menu, select Buchanan Field (Concord), in the San Francisco area. Choose runway 32R. Next, select the Cessna 182S from the **Aircraft | Select Aircraft...** menu. We have to say goodbye to the Sopwith now, as we progress to more sophisticated navigation aids.

Tune the ADF to 282: a radio beacon called "SHARPE" located at Sharpe AAF base. Tune the ADF via the **Aircraft | Navigation...** menu, and select the "Transponder/ADF" tab (see the map in Figure 7 on the previous page).

The ADF is located in the upper right corner of the panel. Check that the needle is pointing to about five o'clock. That shows the ADF is working and is pointing to SHARPE (see Figure 8). Make a note of the time before you set off. You should reach Sacramento Executive 28 minutes later.

Apply full throttle and take off. At 400 feet, turn right until the ADF needle points straight up. Climb to 3,500' and try to hold the needle straight up (see Figure 9).

After a while the needle will seem to go out of control, swinging sharply to one side and not swinging back when you make a small heading correction. That's because you're almost on top of the beacon. Just fly straight for a short time, and the needle should swing round to point behind you. While you're waiting, look out of the left

Virtual Flight Training: Point to Point Navigation



Figure 11
Once the ADF needle has swung around to point straight down, make a gentle left turn...



Figure 12
... to line up for a landing on runway 29R at Stockton.

Well done.

window to see the lights of Stockton Metro waiting to greet you at the end of this flight (see Figure 10).

Once the ADF needle has swung around to point straight down, make a gentle left turn to line up for a landing on runway 29R at Stockton (see Figure 11 and Figure 12).

Well done.

Next time, we'll look at some more advanced features of ADF use, including wind drift and how to steer away from the beacon. We'll also take a closer look at night landings.



Lights — The first navigation aid

Aside from the existing road maps and written descriptions of landmarks visible from the air, the end of the 1920s saw the first airways being marked in the United States—not by radio aids, but by lights!

One-kilowatt searchlights were set up at 10-15 miles intervals along important cross-country routes. Rotating slowly, they gave a clear flash every ten seconds. The lamps were supplemented by color-coded flashes of Morse code: green for beacons at airfields, red for other beacons. The Morse identification letters were sequenced W-U-V-H-R-K-D-B-G-M along the route. After “M,” the next beacon would flash “W” again. The easy memory aid for this sequence was “When Undertaking Very Hard Routes, Keep Direction By Good Methods.”

During the 1930s, radio aids came into use for cross-country flying. Today lights are used for other purposes: color-coded lights are displayed at airfields to identify them; airport runways have patterns of approach lights to aid visual approaches; visual charts mark lighthouses and similar marine lights as useful navigation aids and checkpoints.

It's very easy to dismiss lights as an irrelevance in these days of VORs, ILS and GPS, but when the electronics fail, the most reliable instrument in the cockpit is still the mark-one eyeball. Many pilots still use nothing else.

Full Throttle's Shareware Registration Center

Thousands of flight simmers have discovered and are using many of the great flight sim shareware add-ons and utilities.

Shareware is written by some very talented and dedicated programmers. These programmers devote a tremendous amount of time and effort to writing, maintaining and enhancing their programs. You may not know that most shareware authors do not make a living from their flight sim activities. Instead, they depend on their shareware income to help defray their expenses. In turn, thousands of us willingly pay for their contributions towards making our flight sim experience easier, better, faster and more enjoyable.

Shareware is also a low-cost way to distribute software. You can download the software and try before you buy. If you find that you like the program then you can "register" your purchase by paying a low-cost registration fee. Most shareware authors are more interested in writing programs than in running the "business" end of shareware.

For the convenience of our readers and as a way to promote some very excellent shareware, we've set up the **Full Throttle Shareware Registration Center** to process shareware registrations *immediately* for these authors. Several well-known shareware

authors have already agreed to participate through our Shareware Registration Center.

You can register participating shareware in one of several ways:

- ➔ Call our Toll-Free Line: 800-821-1707 (from US & Canada)
- ➔ Call our International Line: 616-554-7275
- ➔ Fax our 24-hour Line: 616 554-7279
- ➔ Send e-mail to us: sales@ftmagazine.com

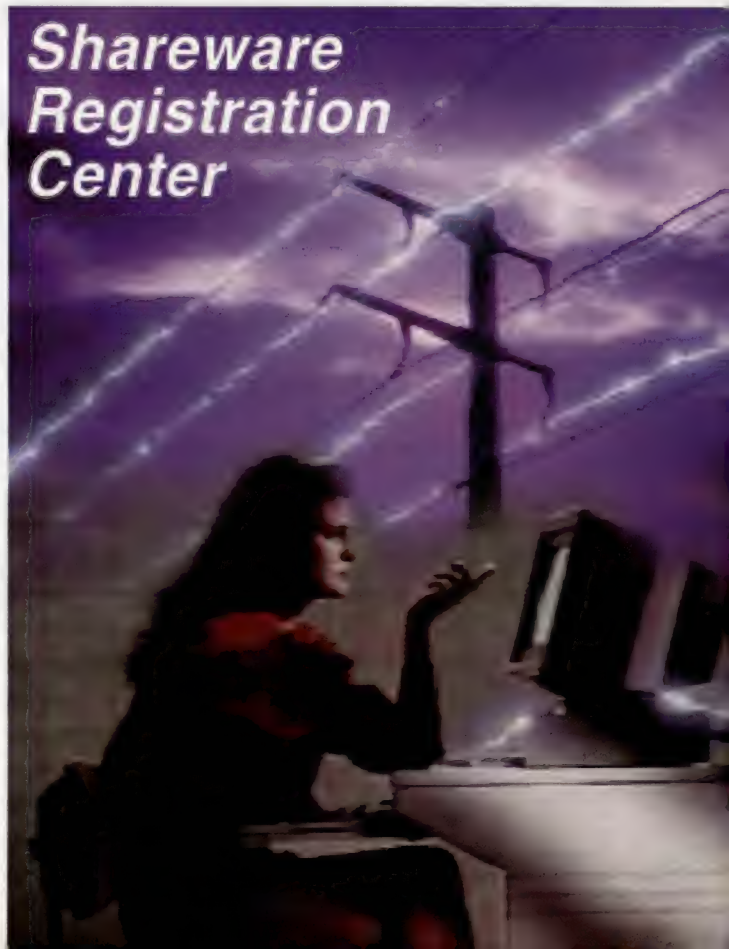
We can accept your payment for registration using any of the four major credit cards. For phone orders, our staff will give you a registration number immediately. For fax and e-mail, you'll receive a registration number within two days.

The registrations are then sent to the respective shareware authors who will in turn keep you advised of any future enhancements.

Attention Shareware Authors

If you'd like to participate in the Shareware Registration Center, please contact Full Throttle.

Shareware Registration Center



Software Registration Center Participants

Moving Map for FS98

By John Hnidec

Registration Fee: \$25.00

This all-in-one instrument displays aircraft position, airspeed and altitude as well as navigation aids and airport data on a large easy-to-read display.

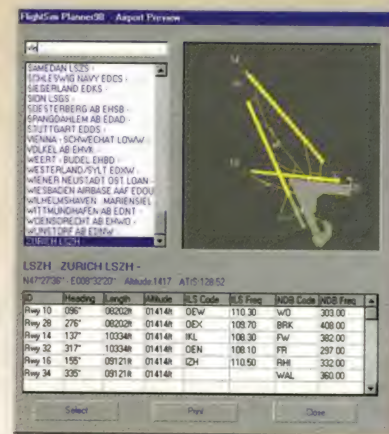


FlightSim Planner 98

By Sascha Felix

Registration Fee: \$25.00

Plans flights automatically or manually from a database of 10,000+ airports. Print flight plans, pertinent airport information and diagrams via the easy-to-use interface.

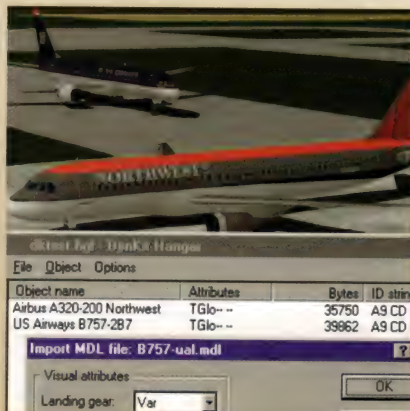


DynKit

By Konstantin Kukushkin

Registration Fee \$99 for commerical use

This is a set of tools for creating new dynamic object shapes such as new aircraft or vehicles. These objects can be used to enhance dynamic scenery in FS95 and FS98. Aircraft made with Flight Shop are easily converted into dynamic object shapes and are then inserted into existing dynamic sceneries. Also includes support files for manually writing low-level code for new object shapes with SCASM and FSASM scenery assemblers (for experts).

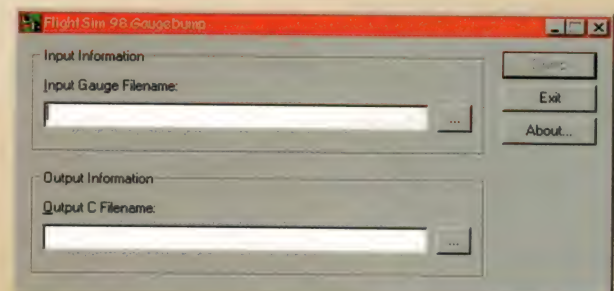


GaugeDump

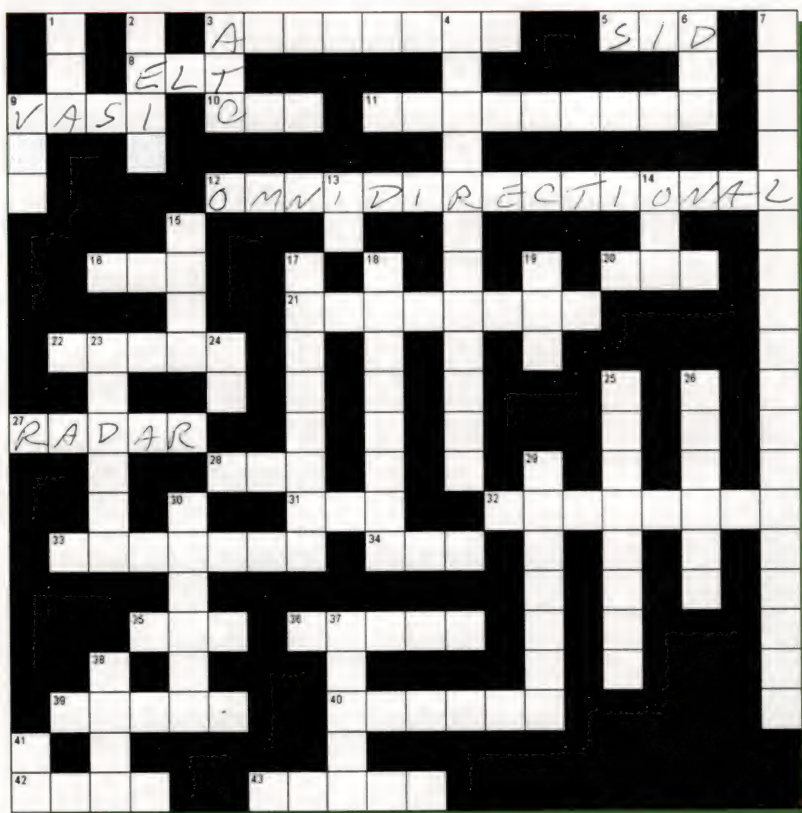
By Bruce Hellstrom

Registration Fee: \$20.00

GaugeDump is a tool for panel designers who'd like access to the details of the FS98 gauges. GaugeDump creates a complete "C" source file of an existing gauge which you can then modify to add additional details and features.



CROSSWINDS



This crossword features general aviation terms and, unless you're a pilot, rates high on the difficulty scale (at least around our office). If you become fogbound, navigate to page 76 for the answers. Enjoy! A special thanks goes out to Nels Anderson for his list of aviation terms available at <http://www.flightsim.com>.

ACROSS

3. Instrument _____ Plate
5. abbr. Standard Instrument Departure
8. abbr. Emergency Locator Transmitter
9. abbr. A system of lights placed next to a runway to allow the pilot to keep the correct glideslope for landing
10. abbr. Vertical needle on the Omni-Bearing Indicator that indicated deviation from the VOR radial
11. Angular distance east or west from the Prime Meridian converging at the poles.
12. The "O" in VOR
16. abbr. A chart using a scale of 1:1,000, 000 Used For vfr flight
20. abbr. Minimum IFR Altitudes
21. def. The operation of heavier-than-air aircraft
22. A position to be assumed by passengers when an airplane is having trouble and losing altitude
27. abbr. Radio detecting and ranging
28. abbr. Weather conditions where visibility and cloud ceiling allow legal VFR flight
31. abbr. A curved ground track of an aircraft flying at a constant distance from a navaid

32. Angular distance from the equator north or south to the geographic poles
33. Standard Terminal _____ Route.
34. abbr. Approximate measurement in hours and minutes when a flight is to be completed
35. abbr. A radio transmitter situated on the axis of a runway that emits a localizer signal to help align a plane with the runway
36. def. Moveable airfoils attached to the wings to increase and decrease drag
39. def. An atmospheric disturbance marked by wind and usually rain, thunder, lightning, hail or sleet
40. def. A strip of land, usually grass, asphalt or concrete, designated for aircraft landing
42. abbr. A system of lights for illuminating the outline of a runway during periods of darkness or reduced visibility measured in Low, Medium and High
43. The "I" in 13 down

DOWN

1. Control for altitude measurement; _____ Level
2. abbr. A pair of white, flashing strobe lights located at the end corner of the end of a runway

3. abbr. Any FAA control facility at airports and other controlled airspace.
4. 2 words. Center of ATC activity.
6. abbr. Radio Equipment that allows the pilot to determine the distance to a navaid; usually coupled with a VOR
7. 2 words. A location on a runway, identified with painted markings on paved runways, that shows the point where a landing aircraft clears all obstacles
9. abbr. A navigation aid that transmits a very high-frequency radio signal
13. abbr. A radio beacon used during an ILS landing approach located near the end of the runway
14. abbr. The dial that displays information from the VOR receiver radio, indicating radial, TO/FROM and glideslope
15. abbr. Traffic Alert and Collision Avoidance System
17. _____ Mile; an international unit equal to 6076.115 ft (1852 meters)
18. The "D" in DME
19. _____ Approach; An approach at minimal altitude over a runway, without the airplane actually touching down
23. A movable airfoil attached to the rear of an airplane to help steer
24. abbr. The radio frequency band between 3 and 300 MHz
25. The "D" of 41 down.
26. def. A _____ approach is conducted on an IFR flight plan which authorizes the pilot to proceed visually and clear of clouds to the airport
29. def. A strip of land designated for aircraft travel to and from a hanger, terminal and runway
30. abbr. Automatic Direction _____
37. abbr. A system of ground-based radio stations that can be used to determine exact geographic location
38. abbr. Standard Terminal Arrival Route
41. abbr. The altitude on an ILS approach at which the pilot must decide if he/she can complete the approach or must do a missed approach

Web Watch

Internet Sites for Simmers

by Adam Howe

Attention passengers: We have just begun our taxi to runway 8R where we will await our takeoff for the great unknown in cyberspace. If you would be so kind as to free some space on your hard drive and log on to the Internet, we will prepare for takeoff.

As we increase speed down the runway, make certain your seatbelts are fastened and your browser is set to <http://erau.db.erau.edu/~vogelr/>. Considering this site's Florida theme, you'll find a lot of Florida scenery. Most of it is for FS5 and FS6, but some FS98 files are available too. You can also find a selection of maps and some panels to use in your simming. Also, this site has a good selection of links.

Let's now set our browser to <http://home.att.net/~chdome>. You may have already guessed this is the hangar of the renowned Chuck Dome: Master of panels, gauges and utilities. This page is rather basic, but it serves its purpose by giving you all the links you need for Chuck's add-ons. If you're interested in using some of Chuck Dome's gauges in your own

panels, but you do not know how to make a panel, then check out the *Full Throttle* website at <http://ftmagazine.com/panels/panel.htm> for a detailed look at panel creation.

As we enter Australian airspace, we should stop at <http://ozpack.pcsa.net.au>. This site, a member of the WebRing, has scenery areas that cover the Australian continent. The aircraft collection is also quite extensive. If you're looking for an Outback flight, this is the place to get the scenery.

Our web tour sadly ends at the Scenery Hall of Fame. Punch in <http://erols.com/tdg>, and be sure you have the hard drive space. Those into flight simming and flight in general can find a great collection of screen savers and desktop themes for your computer to help give you the flying effect even when you're simply using Windows. This site has recently incorporated a search feature to help you locate specific items quickly. Looking for new scenery is easy by using a calendar which breaks the scenery down by month. If you're looking for reviews, this is also the place to be.

Thanks you for flying with Full Throttle Cyberlines. Please return your trays to their original upright position, and make sure your seatbelts are securely fastened. If you have any questions about this trip or you would like to nominate a site for our next journey, please drop me a line at adam@ftmagazine.com. For more information on *Full Throttle*, check out our website at <http://www.ftmagazine.com>.



(Top) Set your browser to <http://erau.db.erau.edu/~vogelr/>. This site provides a lot of Florida scenery. (Bottom) Set your browser to <http://home.att.net/~chdome>. This is the hangar of the renowned Chuck Dome: Master of panels, gauges and utilities.



(Top left) If you're looking for an Outback flight or scenery areas for Australia, visit <http://ozpack.pcsa.net.au>. (Bottom left) Visit <http://erols.com/tdg> for the Scenery Hall of Fame. You'll find a great collection of screen savers and desktop themes.



Round Robin Adventure #2

Seattle, Spokane, Portland (Washington State) area

By Al Pelletier

Required Scenery

This Round Robin (RR) takes place in the Seattle, Spokane, Portland (Washington State) area and was flown with Microsoft FS98. It can be flown with any flight simulator that has the required airports and nav aids. As always, we are using "real"-world navigation.

Geography

On departure from Seattle, you'll see Mt. Rainier on your starboard side. At 14,410 feet, it is visible from most coastal areas of Washington State. It is a dormant Volcano, with glaciers extending in all directions. Spokane, also in Washington State, has 200,000 inhabitants. It is an important rail hub, commercial, manufacturing, transportation and cultural center. Fairchild Air Force Base is in Spokane. Portland is situated on the Willamette River near its confluence with the Columbia, with Mount Hood's snowcapped peaks visible from the city. Portland is known for its spectacular natural setting. The largest city in Oregon, Portland is an economic center for the surrounding region as well as a major deep-water port on the Willamette.

1. Thank you to Chris Squire for test flying the route. Also thanks to Peter Jacobson and Abacus for CoPilot, which was used for flight planning and maps. Thanks also to Andrew Plunkett for the Oregon scenery.
2. I flew a 737 by AETI in this route.
3. Experienced flyers, please be patient through all of the explanations, directions and extras. I direct this at newcomers to the flying world, so I must stick to plain language.

This RR was flown using Microsoft default FS98 scenery and the HIOV50.ZIP scenery by Andrew Plunkett. It can also be flown with any simulators that have the required nav aids and airports. I flew a Boeing 737 by AETI on this trip, which is best suited for a commuter airplane or medium jet.

If you did previous RRs, skip the next paragraph, jump right in, and have fun.

For those who are new to this, Round Robins are published so flight-simmers may explore scenery, refresh geographic knowledge, practice cross-country navigation, fly approaches at airports all over the world, and have some FUN.

You will be given information like airport departure and runway numbers, VOR and ADF frequencies enroute, and two or three middle airport destinations for VFR or IFR approach. Then return to your point of departure (round robin) for an IFR or VFR approach, along with ILS and LOM frequencies, minimums, procedures, etc. You will also get information on the scenery needed to complete the flight and where to get it. Also, you'll learn who created the scenery (for non-commercial) and a little background on the geography of the area.

I also suggest, that you read the route a couple times before starting out, so that you'll have the flight plan fairly clear in your mind.

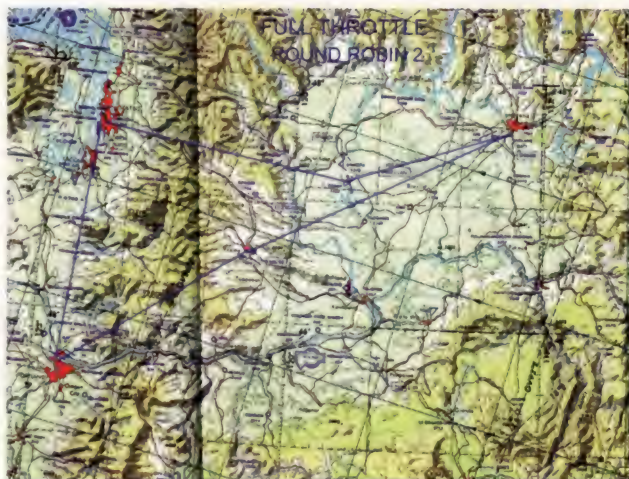
Scenery Required

This RR requires the Microsoft default scenery and HIOV50.ZIP (or newer, if available). (HIOV50.ZIP can be found at <http://wings.ark.com> in the FS98 scenery section or at many other flight sim sites.)

Route:

Seattle Tacoma Intl. (KSEA) to Moses Lake/Grant County (KMWH) to Spokane Intl. (KGEG) to Portland OR (KPDX) to Seattle Intl.

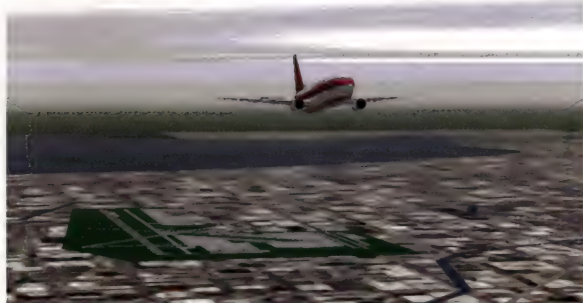
Total route is about 570 nm.



Seattle, Spokane, Portland (Washington State) area

First leg

From:
Seattle SEATAC (SEA)
To:
Moses Lake/Grant County (MWH)
Distance: 140 nm



- ✈ Set the clock to 10:00 and the season to summer in FS's **World | Time & Season...** menu. Visibility and weather should be CAVU (Ceiling And Visibility Unlimited), as set in the **World | Weather...** menu.
- ✈ Select Seattle Seatac airport, RWY (Runway) 34.

- ✈ Dial in the Seattle (SEA) VOR 116.8 on NAV 1 and set 069 on your OBI. Dial in the Ephrata (EPH) VOR 112.6 on NAV 2 and the Pelly (MW) LOM freq. 408 on your ADF.
- ✈ T/O (Take Off) right in a climbing turn to 20,000, turn to establish on the 069 radial of the SEA VOR, and track the EPH VOR. (You should have Mount Rainier (14,410 FT) on your right.)
- ✈ 40 nm out of the EPH VOR, begin a descent to 5,000 ft. Dial in the LOC 109.5 and set 324 on your HSI OBI in preparation for an ILS to RWY 32R (actual course 324, elevation 1,185 and RWY length 13,500).

Second leg

From:
Moses Lake/Grant County (MWH)
To:
Spokane (KGEG)
Distance: 72 nm

- ✈ Set clock to 15:00, and edit the weather: 4,200 Overcast, Visibility 5 nm, Wind 360/15.
- ✈ Dial in the SPOKANE (GEG) VOR 115.5 on NAV2, the LOC (OLI) 111.9 on NAV 1 and set course 025 on your HSI (NAV 1) OBI.
- ✈ Taxi to and T/O RWY 4, making a right climbing turn to 12,000, HDG 055, and track the GEG VOR upon reception.
- ✈ 30 nm out of the GEG VOR, begin descending to 6,500 and turn right HDG 060 in preparation for an ILS to RWY 3 (actual course 025, elevation 2372, and RWY length 9,000).
- ✈ Intercept the LOC and proceed with approach.
- ✈ Five nm back you are cleared for a full stop to RWY 3. Check to be sure the gear is down.

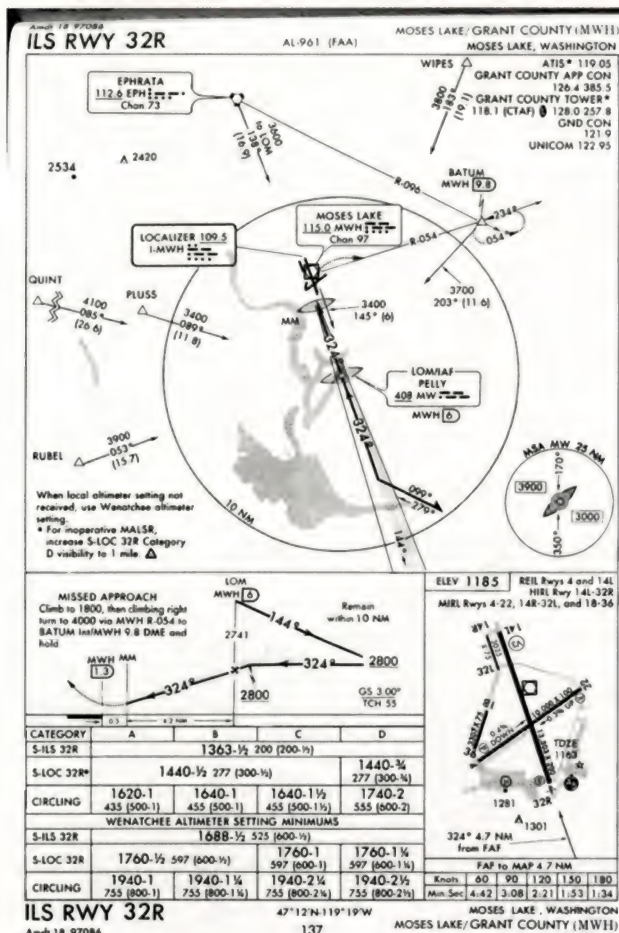
LAND Spokane

- ✈ Over EPH, turn right and home in on the MW LOM maintaining 5,000. (You'll overfly the Grant County airport on the way.) On top the LOM, descend to 3,000 and continue on heading for two minutes at approach speed. Then, turn right HDG 300 and intercept the LOC. (There is no DME on this LOC. You can use the Moses Lake VOR (MWH) 115.0 for DME—the VOR is located on the airfield.)
- ✈ Five nm back, you are cleared for a full stop to RWY 32R. Be sure your gear is down.

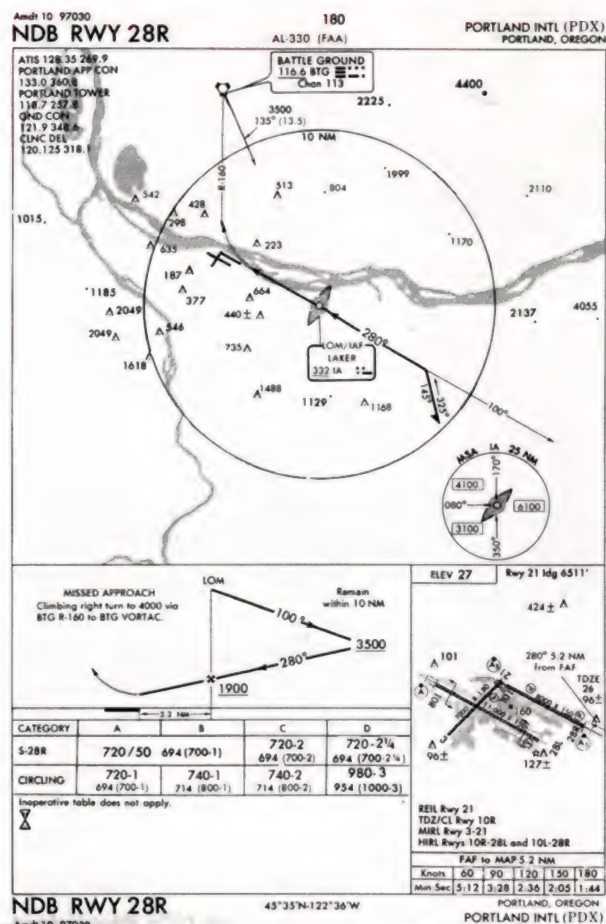
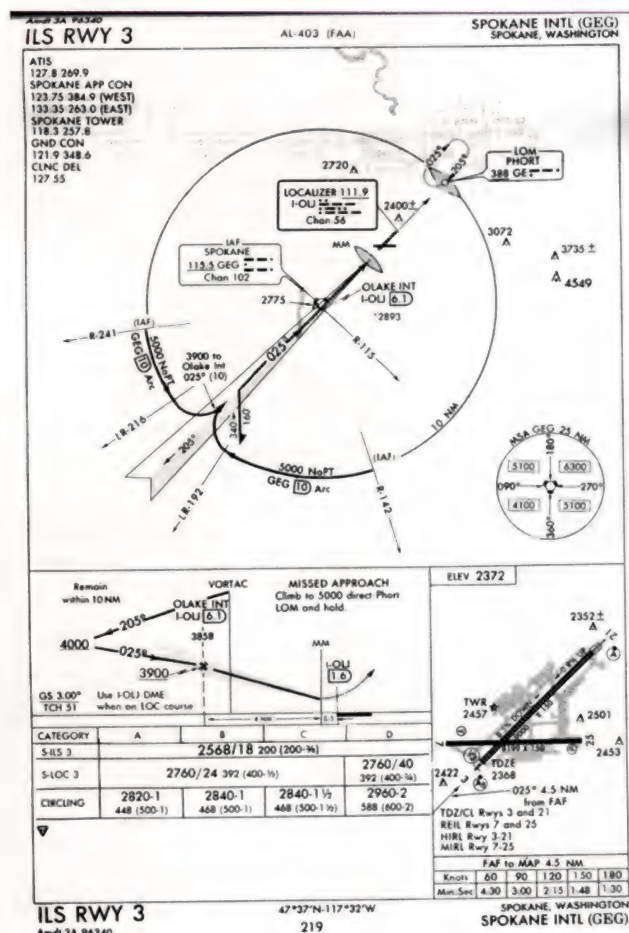
LAND Moses Lake/Grant County

Round Robin Aviation Abbreviations

HDG	Heading
NDB	Non-directional Beacon
OBI	Omni-bearing Indicator
RWY	Runway
VOR	Very-high-frequency Omni-directional Range



A Round Robin Adventure



Third leg

From:
Spokane (KGEG)

To:
Portland (KPDX)

Distance: 236 nm

- Set clock to 20:00 and edit the weather to CAVU, with light wind.
- Dial in the YAKIMA VOR (YKM) 116.0 on NAV 2 and the SPOKANE (GEG) VOR 115.5 on NAV 1 and set 223 on your NAV 1 OBI.
- Taxi to and T/O RWY 21, right climbing turn to 27,000, establish on the GEG 223 radial. Remain on the 223 radial until reception on the Yakima VOR. Track the Yakima VOR to on top.
- On top YAKIMA, dial in and track the BATTLE GROUND (BTG) VOR 116.6. Enroute BTG, dial in the Laker (IA)

LOM freq. 332 in preparation for an NDB approach to RWY 28R (actual course 280, elevation 27 and RWY length 8,000).

- 40 nm out of the BTG VOR, turn left, home the LAKER LOM, and begin a descent to 6,500.

NOTE: You'll have to lose 20,000 ft in only 40 nm here. You couldn't descend earlier because Mount Adams (13,000 ft) is right in our path.

Reduce to approach speed and over-fly the NDB. After on top the NDB, turn left HDG 135, descend to 3,000 and hold HDG for two minutes. Then turn left HDG 325.

(Watch your ADF needle. You want to over-fly the NDB on a HDG of 280.)

- Proceed with the approach.
- Five nm back you are cleared for a full stop to RWY 28R; check gear down.

LAND Portland.



Seattle, Spokane, Portland (Washington State) area

Fourth leg

From:
Portland OR (KPDX)
To:
Seattle/Tacoma Intl. (KSEA)
Distance: 95 nm

- ✈ Set clock to 21:00.
 - ✈ Taxi to RWY 28L.
 - ✈ Dial in the OLYMPIA (OLM) VOR 113.4.
 - ✈ T/O, climb RWY HDG to 4,000. Then, right turn, track the OLM VOR (approx. HDG 330), and continue climbing to 13,000. Enroute OLM, dial in the LOC (I-SEA) 110.3 and set 338 on your HSI (NAV 1) OBI, in preparation for an ILS to RWY 34R (actual course 338, elevation 429, RWY length 11,900).
 - ✈ 35 nm from Olympia, begin descending to 5,000. Over Olympia, turn right HDG 035 to intercept the LOC and descend to 4,000. Dial in the SEATTLE (SEA) VOR 116.8 for DME and the PARKK LOM 281. (It's about a 10 to 15 minutes run to the LOC intercept.)
- Intercept the LOC (keep an eye on both the Seattle VOR and the LOM to anticipate your turn to 338 degrees). Five nm back, you are cleared for a full stop to RWY 34R; check gear down.

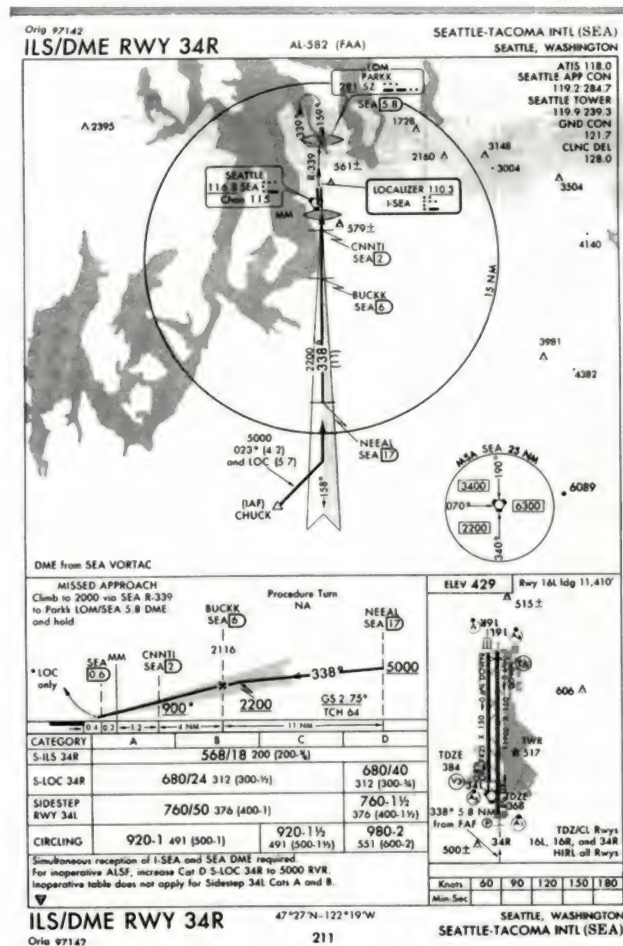
LAND Seattle

WELCOME HOME

Visit Al Pelletier and his crew at:

<http://www.wings.ark.com>

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In the Tehran Summit Conference (fall of 1943), The WWII Allies unanimously supported Croatian Josip Broz (a.k.a. Josip Tito) and his guerrilla Yugoslav forces harassing the occupying German Army. Dozens of liaison officers and men parachuted into mountainous areas to link up with partisan groups in early 1944. (Flat country was not good for them because they couldn't hit, run and hide.) The liaison teams brought long-range radio equipment. A powerful radio center was established in Cairo, Egypt to receive their daily requests for weapons, ammunition, explosives, medical supplies, clothing, etc. Cairo sorted and established priorities for these requests, which were forwarded to the British supply group who made up the loads and assigned the targets. Brindisi, Italy was selected as the base of operations because it was close to the area to be served and had an operational airfield. I had no idea at the time that we were tacitly members of a British force.

The 60th Troop Carrier Group, of which I was a part, consisted of a Headquarters and the 10th, 11th, 12th and 28th Squadrons. Each squadron was equipped with C-47 Skytrain aircraft, sometimes referred to as "Gooney Birds." Each squadron had 12 aircraft, plus possibly a couple of spares in case of need. I joined the 12th Squadron in early December, 1943 and moved with the Squadron from Gerbini, Sicily to Brindisi, Italy the last week in March, 1944.

On the night of April 2, 1944, our real work began. It continued for six months, until the Allied completion of the Balkan campaign. The Balkans, for our purposes, are Northern Italy, Yugoslavia, Albania and Greece. Our squadron regularly flew into each. The flight objective was to "re-supply;" approximately 3.4 million pounds

of supplies were either landed or dropped to the partisan forces. Our cargo was familiar and unusual, including gold to buy local items, land mines, ammunition, salt and even mules. Besides dropping supplies, we often landed and picked up men of the Office of Strategic Services (OSS). These agents would blow up bridges, roads and railroads and do other nasty things to confound the occupying Germans.



We picked up and returned to Italy about 1,600 people: escaped aircrew, wounded partisans, political opposition, and civilian men, women and children. One night, after landing in Yugoslavia, I was loaded for my return to Italy with 72 little children about three years old, with a 17-year-old girl and an elderly couple to care for them all. They were to go to Foggia, Italy for further care.

Flying the C-47 in World War II The "Balkan Air Force"

By Claude Dickens

Along with a crew of five (pilot, co-pilot, navigator, crew chief and radio operator), that made 80 humans aloft in one C-47. That is probably a record since the aircraft it was modeled from—the famous DC-3—carried less than half that number in passenger configuration.

We may even have provided passenger service to dignitaries. A mission into north-central Yugoslavia delivering communication equipment was successful. When we were about to depart, a lady and her "maid" were brought onto the plane. My instructions were to take them to Foggia, Italy. No problem, we had plenty of room. After we arrived safely and the ladies had departed, one of the people

...All 85 of my missions were flown in darkness, except for three daylight missions (which included a fighter escort to fend off German air attacks), so takeoffs began shortly after dusk for the longest flights...

there to greet them told me the "maid" had actually been Tito's wife. I don't know this to be true or false, but I accepted it as true

flights. Some targets were in far north Yugoslavia, requiring three hours of flying

and am damned proud of it. I've always felt that flight might have had some bearing on my later receiving the Order of the Partisan Star from Yugoslavia.

All 85 of my missions were flown in darkness, except for three daylight missions (which included a fighter escort to fend off German air attacks), so takeoffs began shortly after dusk for the longest

time each way. For targets with multiple payloads, the individual planes left at 15- to 20-minute intervals. That allowed sufficient time to descend to drop altitude of 500 - 800 feet (depending on the height of the surrounding mountains), make the two or three passes necessary to push the packets out the back door so they'd land in a reasonably small area, then get up and out of the way for the following aircraft. We flew with no lights in or on the plane, maintaining strict radio silence. A lit cigarette was severely frowned on. Even the exhausts were covered.

Our navigation methods were pretty primitive. We had geographic coordinates that we could locate on a map, although we sometimes found the maps inaccurate. Our navigation was a combination of map reading (if there was moonlight), dead reckoning and by-guess-and-by-God. Occasionally we would never find the target, returning the load to Brindisi for a try the next night. Unless

Brief History of the Douglas C-47D "Skytrain"

Few aircraft are as well known or were so widely used for so long as the C-47 or "Gooney Bird" as it was affectionately nicknamed by servicemen. The aircraft was adapted from the DC-3 commercial airliner, which appeared in 1936. (A British version was called "Dakota.") It was the workhorse of the armed forces for many years. The first C-47s were ordered in 1940 and the USAAF (US Army Air Force) procured 9,348 by the end of WW II. Besides carrying personnel and cargo, the C-47 towed troop-carrying gliders and dropped paratroops into enemy territory. It figured prominently in the European D-Day invasion. Since it could carry heavy loads to high altitude, the C-47 was used extensively to fly supplies "over the hump" (The Himalayas) in the Asian theater of WWII.

Many C-47s remained in service after WW II. They were used in the Berlin Airlift and other peacetime activities. The C-47s again saw combat action during the Korean War. They were used to haul supplies, drop paratroops, evacuate wounded and drop flares for night bombing attacks. The C-47 served again as a transport during the Vietnam War. It was also used in other roles such as flying ground attack (gunship), reconnaissance, and psychological warfare missions.



C-47 Specifications *

Span:	95 ft. 0 in.
Length:	64 ft. 5 in.
Height:	23' 6"
Weight:	33,000 lbs. loaded
Engines:	Two Pratt & Whitney R-1830s
Crew:	Five or Six
Maximum speed:	232 mph.
Cruising speed:	175 mph.
Range:	1,330 miles
Service ceiling:	24,450 ft.
Fuel capacity	668 gal.

* These specifications may change depending on the version and role of the C-47 but are typical for the aircraft.

the Germans were near by, the ground party would light a pre-arranged signal. A square of four fires and a circle of six fires were typical signals. Once we found the drop target, we flashed a three-letter Morse code of the day from a lamp mounted in the belly of the airplane. The ground party responded with a different three-letter code. Both sets of code letters changed daily for each target. If we didn't get the proper signals from the ground, we didn't let down. We went home, because it might have been the sly Germans trying to coax us down to where we'd be more vulnerable to ground fire.



*...Though we faced many dangers,
the most persistent was becoming
bored and complacent...*

Coming out we would carry wounded, escaped POWs, American and British air crewmen who had bailed out and were picked up by the Partisans, returning

OSS men and missions of mercy, such as the children mentioned before.

One such incident comes to mind. Those wily and rascally Germans had a bad habit of sitting on some of the mountains that they suspected were drop or landing areas. When the Partisans lighted the fires, the Germans radioed their forces on the other side of the mountain to light duplicate fires. I unwittingly arrived at such an area one night. Seeing only one set of fires, the duplicate, I started the ritual of light signals. But we didn't get the proper signals from the ground. We tried twice and still got the same junk from the ground. We left immediately, and as we topped the mountains—lo and behold—there was another set of fires. After giving and receiving the proper signals, we descended into the valley, made our three or four passes to get the packages out and then skedaddled for home base.

We lost one plane and crew with no reports as to what happened. I always suspected they were lured in by one of these traps and either riddled by ground fire or coyly directed into a mountain by some kind of signal.

A few Partisan groups were located in areas remote enough and with appropriate terrain where it was possible to lay out a relatively level space of 1,200 to 1,800 feet, long enough for us to land. Having this ability, we could take in items too delicate, heavy or dangerous to drop, such as medical and radio equipment, land mines and ammunition, passengers and, one time, mules to transport the heavier guns and equipment.

Hauling mules is a lesson in concentration. I had four of those rascals to land in Yugoslavia. The problem is that they shifted their weight, sometimes together and sometimes separately. I would suddenly be climbing rapidly when they shifted aft, or descending just as rapidly if they shifted forward. We got them there all in one piece, but unsettled. I'm sure cleaning the plane later was a task—fortunately, not *mine*.

The landing missions were not fun and games. The landing zone was invariably in a narrow valley. A line of bonfires spaced 100 yards apart lined the left side of the "landing strip," with one more fire on the right side at the landing end. We used the bonfires as runway lights to line up with the strip and to give the pilot a sense of perspective to determine where the ground was, which could be misleading because of the height of the fires. You could "land" high very easily. We almost never cut our engines on the ground, and we usually were airborne in less than ten minutes. However, I remember one notable exception to the ten minutes turn around. One night a senior officer of Group Headquarters had landed immediately ahead of me. Not knowing he was still there, I came in to find he had overshot and had jumped a little creek at the end of the strip. He was in a quandary trying to think of how to get it back across. He asked for ideas, and I said jump it over. He asked if I would do it. I backed the old Gooney Bird as far as a stone fence would allow, giving me about a 150

feet to run before the creek. I put down full flaps, applied full brakes and ran up the engines till that C-47 was literally almost jumping up and down. I released the brakes and put the wheel forward. When I reached the creek, I pulled the wheel sharply back. Believe it or not, that grand plane jumped back over the creek. I never snitched about that "high ranking officer" to but one person until now, 54 years later.

Sitting on the ground may be most unnerving to a pilot. One beautiful night my entire payload was four OSS agents and their sizable backpacks. My objective was to land in north-central Greece. The flight was uneventful, but when landing I was told to wait until the OSS men returned. It seems that they and some of the Partisans that met us were going to hike about a mile up the canyon, blow up a pair of bridges, one road and a railway, then return. You talk about high blood pressure; we were as sitting as any duck could be. We waited about 45 minutes. Shortly after we heard a loud KABOOM, they reappeared. We must have set records starting up the old Gooney Bird and getting the hell out of there, because we knew some terribly upset Germans would be looking for us immediately.

After the apprehension of the first few missions flying over the enemy lair in the dark, the flights became more boring than fearful. To be sure, "alertness" had to be the watchword. But even that got to be difficult after four or five hours boring holes in the air, as the expression goes, particularly if not punctuated by the adrenaline rush of letting down and dropping packages or landing at the target. Care had to be taken to track our location all the way in and out, being sure to give wide berth to known anti-aircraft gun locations. Those were generally the larger cities inland and the ports of Fivne, Split, Duraggo and Zadar (a large German airfield location). To this day I'm suspicious that one



of our navigators deliberately took us over one of those ports regularly, probably for one of two reasons. One, to hassle the rest of the crew, and two, he would know exactly where we were, making further navigation easy. (It is an absolute that the closer you are to an intended destination when a compass course is set, the less error accumulates due to crosswinds or compass deviation in the intended route.)

Although the 60th Group flew approximately 7,000 missions into the Balkans, which equates to a huge tonnage of supplies, a number of those missions were unsuccessful. In those cases, the loads were not dropped or landed but returned with us to Brindisi. There were two primary causes for the failures: bad weather and inexperience. I was lucky to have joined in the missions a few weeks after they started and to have flown several missions as a co-pilot to experienced pilots. I was fairly well up to speed when I became a first pilot, and I had fewer aborts than earlier flights. Of course, the spring weather in the Mediterranean area took its toll on all of us, me included.

On a long mission to northern Yugoslavia, I flew solid instruments for well over two hours. I never saw the ground after leveling off and, of course, never had a chance to see signal fires. Considering the conditions, I told the co-pilot to take the wheel, do a 180° turn and head for home. Then I nestled down for a little break. When I awakened an hour or so later, we were over land in broken clouds. That got my attention because we should have been over the Adriatic Sea all the way home. A quick check



of the compass revealed that my m a t h - deficient co-pilot h a d turned 270°. We were well on our way to an extended stay in Germany. A quick turn put us on a course to go home. Now you may say, "Where was the navigator all this time?" I can only guess he was also napping.

Though we faced many dangers, the most persistent was becoming bored and complacent: most of the missions were take-off, pull up gear, level off at tree top level, fly a couple of hours to your landing or drop site, go through the ritual and turn for home. Then we usually visited the Officers Club for a libation or two before going to bed. But those occasional missions when all hell broke loose tended to keep us alert.

On a night with just a hint of moonlight, I was moving along about 500 feet above the local terrain when a huge Lancaster (British) bomber appeared suddenly from my left, flying absolutely in front of me at the same altitude. Neither he nor I had time to react, but we missed each other. I'll bet my right wingtip didn't miss his tail by more than 20 feet. Those events can cause stained underwear.

Another time over northern Greece, we found the drop zone, exchanged the proper signals and made three or four passes to get the bundles out. When it came time to climb out of this tiny valley surrounded with steep mountains, I realized that the climb would be difficult. There was not room enough to make proper climbing turns. The only option left was to stand the plane essentially on its tail and ascend as quickly as practical. Pretty soon every light on the panel was red, so I leveled a bit and turned sharply. I went through this twice and finally got over the mountains. How and why we went down in such a small valley, and why we were scheduled to do so, is a mystery to me.

One mission, which started as one of those boring nights, almost became instant disaster. On the second pass at the drop zone, a parachute attached to one of the packages somehow became entangled in the tail

section of the airplane. The control surfaces became useless, and we started toward the ground. What to do? Though I don't know why, I immediately started furiously kicking the rudder pedals. In a few seconds the parachute dislodged, and I regained control. This was another case of laundry requirements for underwear.

One of our pilots recently reminded me of one hair-raising drop. The mission occurred about the same time as the main ground offensive began to capture the city of Rome. Leaving Brindisi, it was necessary to cross a high range of mountains to get to the Rome area. The mission was to drop loaded machine guns, rifles, hand guns, hand grenades, ammunition and other assorted armaments into a prisoner-of-war camp located about 20 miles south of Rome. This type of action was taken several times to confuse and decoy the German forces as to what really was about to take place.

On decent to drop altitude, we concluded that four passes would be required to get all the bundles out of the door. The first pass was uneventful, but all hell broke loose as the plane came round for the second pass. Intense firing had started on the ground, and tracers filled the sky. Flashes from the explosions on the ground could be heard as well as seen. On the third pass, firing on the ground continued, but not as intense. The drop was completed in three passes rather than four, so we cut away from the prisoner camp and started climbing out to return to Brindisi.

As we set course for home, tremendous artillery barrages were beginning on the southern front as well as the Anzio front. It was clear that the big push had started. The city of Rome fell less than two weeks later. We had contributed in a positive way to the war effort and the freeing of southern Italy.

Our flight schedule usually consisted of four nights flying, one night off. On our night off, we usually formed bible study groups or other educational activities (and if you believe that, I have some prime land I'd like to sell you). Actually, we followed the normal activities of young men in a foreign country, where there was drink and lots and lots of pretty girls. As to the drink, other flight squadrons usually tested local libations and advised us of those least likely to cause blindness or death. We felt that if we didn't



drink the stuff, it would evaporate and be wasted. As to the girls, the hormone count was probably off the chart.

Though the flight schedule described above was routine, we also had an informal inter-squadron agreement that if a squadron had a special occasion or celebration, the other squadron would fly their missions. On one such occasion, a fellow flight leader and I volunteered to take a mission. My fellow flight leader was a rascal in disguise. He was in prime form when he engaged ("shanghaied" is more accurate) a brand-new navigator, just from the U.S. The mission itself was routine and problem free. But as we were flying at tree top level on our way back to the Adriatic coast, my fellow flight leader, knowing there was a major German airbase nearby, innocently asked the navigator, "Have you ever seen a German airbase?" Of course, he answered no. Almost immediately we hopped over a hill, and there in all its glory was a German Aerodrome. We went straight down the main runway at about five feet altitude, knowing full well that they would not fire at us for danger of shooting each other or their own airplanes. The young navigator turned white as chalk. The rascally flight leader thought that we had pulled one on the Germans and had initiated a navigator into a pretty nutty squadron.

We had one-upped the Germans and scared a new navigator half to death. But little did we know that the Germans, who didn't share our sense of humor, were capable of one-upmanship, too. They alerted every air gunnery position for miles along the Adriatic coast. When we arrived at treetop level, they all, *and I mean all*, loosed their guns at the same time, directing everything but bathtubs at one C-47 whose crew was just attempting

a practical joke. Well, discretion being the better part of valor, we put that old bird about four feet over the waves. That saved us from anti-aircraft fire, but allowed salt water to cover the windshield. That's OK when you are at a couple thousand feet, but not at water level. We pulled up to a respectable altitude, maybe 100 feet, and the rascal opened the window beside him, climbed out as far as practical and cleaned the windshield with an alcohol rag so we could land. It was basically a routine mission, resulting in a very nervous navigator. We did not do that again.

The first of our daylight missions was highly unusual. All first pilots were called to a briefing alongside the airstrip at Brindisi. The briefing described how we were to take a group of planes into Yugoslavia, land, load political dissidents and former political prisoners and return. Only first pilots were selected, because we were to expect severe attacks both from ground fire and fighter planes—we were told to expect a 20% loss. Therefore, if the pilot was hit and incapacitated, the other pilot could continue the flight. They next asked for volunteers. Almost everyone stepped forward, looking around with pity at the 20% of us that would not return. As fate would have it, we all flew, landed, loaded and returned. We wouldn't have been so fortunate without our air cover—the Tuskegee airmen. We knew very little about them at the time, except they were all black. They were the Jackie Robinsons of the Air Corps and did a fabulous job. They accompanied all our daylight missions, and we lost no aircraft to German fighters.

This particular mission has a funny ending. After landing our passengers at Foggia, we of the 12th Squadron returned to Brindisi in formation. As we approached the field, our flight leader radioed, "Get in trail formation, and make a fighter approach." That was an unusual way to approach, and the Commanding Colonel on the ground asked who this group was. When told it was the 12th Squadron,

he is rumored to have said, "Oh my God," covered his eyes and turned his back. We did exactly what our leader had told us to do. We flew straight down the runway at five feet or so, did a Chandelle maneuver, then continued a climbing turn to the end of the runway, put down gear and flaps and landed. Had the Colonel watched, he probably would have had a stroke—he was an elderly man of 26 years. We pilots probably averaged 22 years old, except for me. I was an ancient 25, and those young whippersnappers did then and still do call me "Pop."

As an adjunct to several of my missions, we performed an activity called *nickeling*. This not only permitted, but required us to cruise over a town on our mission route at housetop level. Besides scaring the daylights out of the inhabitants, we dropped leaflets and other printed information to provide war news and encouragement. I know this worked well, because thirty years later I met a scientist who was a Yugoslavian schoolboy during WW II. He described the hope the natives received from this activity. Such plush assignments as this couldn't last forever, and with the Russians' imminent advance into Yugoslavia and the corresponding evacuation by the Germans in the early fall of 1944, our Partisan re-supply missions were drawing to a close. The last missions were flown during the last week in September, 1944.

That is not to say we could now find a rocking chair and relax. We flew two mass daylight missions in mid-October.

The resistance forces in Greece were split into two camps, pro- and anti-Communist. The British, alarmed over the possibility of a Russian occupation of that country, wanted troops on the ground there as quickly as possible. What could be quicker than air transport? With our considerable experience over the country by night, the 60th Troop Carrier Group again came to the fore. We loaded the entire 60th fleet of C-47s with British troops and took them to Patras, on the northwestern corner of the Peloponnesus. Two days later, the entire 60th Group and another Troop Carrier Group flew more than 2,000 British paratroopers (many of who I had helped train at Bari, Italy) to the Gulf of Corinth, dropping them over Megara, from where they could rapidly occupy Athens.

...This sizable crew chief had his foot right on the rear end of the reluctant paratrooper and must have propelled him 20 feet straight out. Mission successful!

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Now, as a well-known radio newsman puts it, "The rest of the story." Of the 80 or so C-47s, six carried paratroopers reluctant to jump (including mine). We were instructed by radio to reform and return to the jump zone. We did as instructed and, would you believe, one trooper still did not jump? He was on my plane. My crew chief, a rather large fellow with very large feet, came to the cockpit and asked that we go in again alone, and he was sure the soldier would jump. We did as he asked, and I gave the green light and looked back. This sizable crew chief had his foot right on the rear end of the reluctant paratrooper and must have propelled him 20 feet straight out. Mission successful!

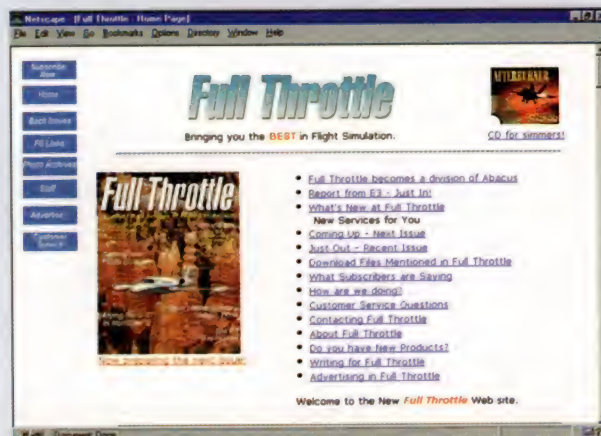
We then moved to Pornigliaus, Italy, which is near Naples and just at the northern foot of Mt. Vesuvius. There we went back into the normal humdrum of a Troop Carrier, carrying people and cargo hither and yon, the military equivalent of "You call, we haul." I took equipment and people to or from Cairo, Tunis, Tripoli, Algiers, Oran, Gibraltar, Casablanca, Tel Aviv, London, Paris, Lyon, Dijon, Athens, Solnica and many, many other places. It was a fascinating summer and fall on combat missions and much fun and games at the others during the winter of 1944-45.

On our return home, as we passed beyond Gibraltar aboard the luxury liner Mariposa, the speakers announced Germany's surrender. We were at lunch, and everyone looked up and nodded. Nodded you say, no cheers, yells, etc.? We were thrilled, but not excited—we had already known it would happen soon.

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Check out the back issues and other information and files available on the Full Throttle website.



Flight Director 98

from Flight1 Software

Reviewed By Phil Paschutine

At long last, an EFIS, a GPS, a moving map and a real weather engine for FS 98 are all gathered into one software package! The new Flight Director 98 from Flight1 Software provides this unique combination of features in an easy-to-use, point-and-click interface.

Flight Director 98 incorporates powerful tools for flight planning with a fully functional GPS (Global Positioning System) Moving Map, an EFIS (Electronic Flight Information System) and real-time Weather Radar displays. The program presents these displays in superimposed Win95 windows. FS 98 users who require full-screen mode for hardware acceleration can use the "special" GPS/EFIS mode to display the data presented from Flight Director 98.

*...Flight Director 98 incorporates
powerful tools for flight planning
with a fully functional GPS (Global
Positioning System) Moving Map,
an EFIS (Electronic Flight
Information System) and real-time
Weather Radar displays...*



The weather engine in Flight Director 98 uses real-world weather conditions, which can be downloaded from the Internet in the form of METAR data. Or, you can generate your own weather conditions. Flight Director 98 is completely compatible with the Flight1 program FSCLouds 3.0 (available separately).

Flight Director 98 also features an ATC module (not audio) to interface with your flight plan and provide you with much more functional ATC, tower and ground instructions than are possible with the pre-formatted ATIS style messages incorporated into many add-on sceneries.

Installation

Flight Director 98 comes on a CD. Installation is automated and depends on your choice of browser (for METAR downloads). The installation process was smooth, and it sets up everything

needed to run the program. The link between Flight Simulator and Flight Director 98 is done through Adam Szofran's FS6IPC.DLL, which allows other applications to access the simulator's state data while Flight Simulator is running.

Operation manual

The software is shipped with a 24-pages handbook (US version). Although the handbook is well written and includes a step-by-step tutorial, it does not detail every function. You'll have to do a bit of searching on your own to learn how everything works. That being said: the whole program is very user friendly, so you will not have any problems using all its features.

Feature Review

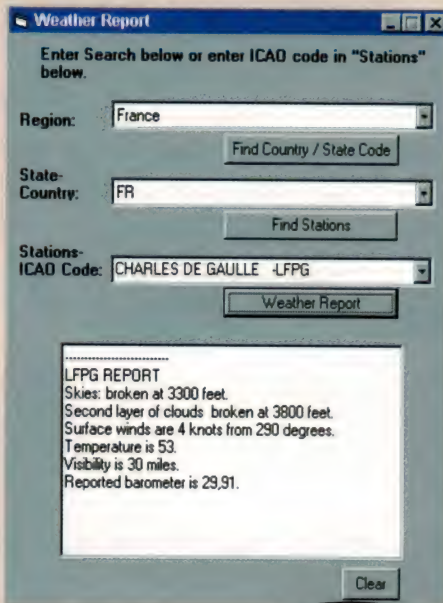


Figure 5

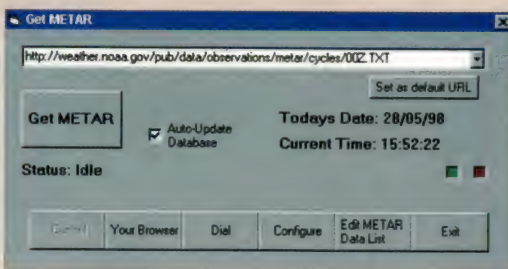


Figure 4

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Figure 1: As you can see, the point-and-click interface has several modules: An information and status area at top left, weather and settings at the bottom left, flight planning in the upper right, and choice of MAP, GPS or EFIS at the bottom right

Figure 2: The information and status window shows your current position, flight data and the closest station.

Figure 3: The Weather Settings feature lets you download the latest METAR weather file from the Internet and updates automatically as you enter a new area with METAR data

Figure 4: If you have Internet access, you can load a downloaded METAR file. Although you can automatically update the database, some METAR files are over 600K.

*Figure 5: Once the METAR is loaded, you can update Flight Director's weather database METAR file. Click the **Weather Report** button and locate your station if you are interested in finding out what is in store for you at your destination.*

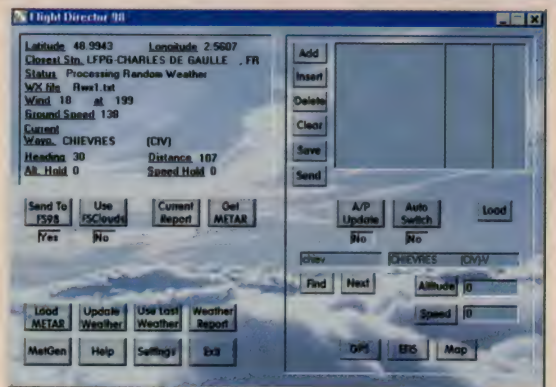


Figure 1

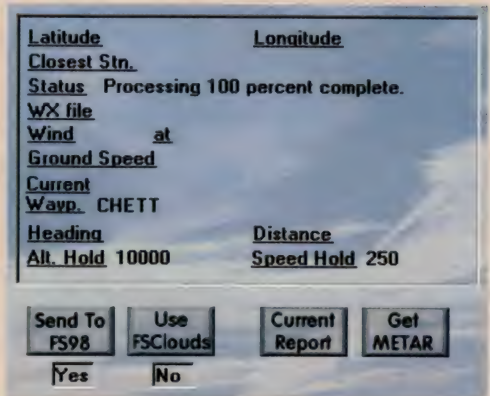


Figure 2

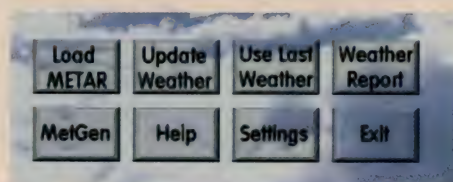


Figure 3

The User Interface

The point-and-click interface has several modules: An information and status area at top left, weather and settings at the bottom left, flight planning in the upper right, and choice of MAP, GPS or EFIS at the bottom right (see Figure 1).

The information and status window (see Figure 2) will show your current position, flight data and the closest station. Clicking the **Current Report** button will bring a pop-

up window with decoded METAR data for the nearest station. The **Send to FS 98** and **Use FS Clouds** buttons are reminders of your setting choices. These two buttons can be toggled on and off from this window. The **Get METAR** button will connect you to the Internet and to the URL(s) entered in the list.

The innovative Weather Settings feature allows you to download the latest METAR weather file from the Internet, so you may fly with the current real weather in Flight

Simulator. The weather updates automatically as you enter any new area that has METAR data (see Figure 3).

If you have Internet access, you can load a downloaded METAR file (see Figure 4). You can automatically update the database, but be advised that some METAR files are over 600K. Once the METAR is loaded, you can update Flight Director's weather database METAR file. If you are interested



Figure 12

Images on this page - starting from the top right and moving clockwise

Figure 6: Use the MetGen feature to create your own weather environment if you do not have Internet access.

Figure 7: Back in the main window, load the MetGen flightplan.

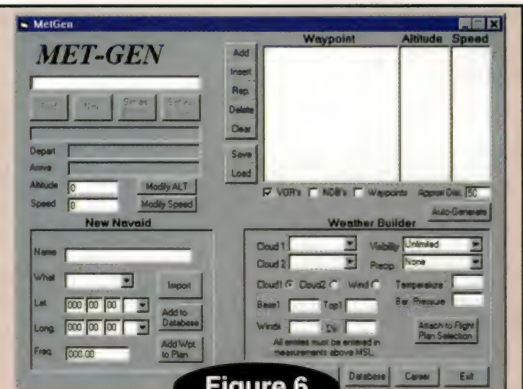


Figure 6

Figure 8: Then send it to FS 98.

Figure 10: The Map (left) and GPS (right) are simple and straightforward indicators. Additional waypoint information is available if you right-click on the point.

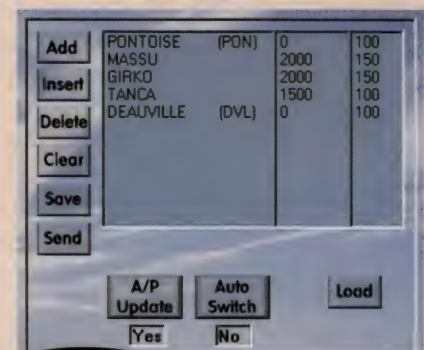


Figure 7

Figure 11: You can switch to another waypoint in flight and a new plot line will appear from your current position to the new waypoint.

Figure 12: In Map or EFIS mode, you can display cloud coverage and precipitation. Both are color-coded. If you click on a cloud, you will obtain information concerning the cloud base and winds.



Figure 11



Figure 10

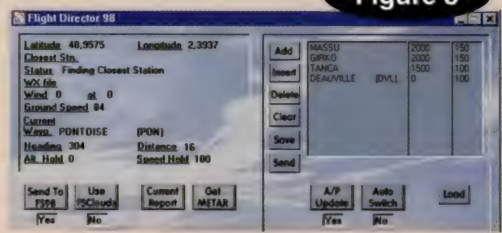


Figure 8

in finding out what is in store for you at your destination, just click the **Weather Report** button and locate your station (see Figure 5).

As an experienced pilot, you will also want to check the weather at the other areas into which you will fly. If you look at the information and status area, you'll be able to check the current weather at the closest station. Contents are the same as in the weather report.

If you do not have Internet access, you can use the MetGen feature to create your own weather environment (see Figure 5). MetGen is a flight plan builder and custom weather builder for any points in your flight. A flight can be built several ways. Define Departure and Arrival points, which may be

airports, VORs, NDBs or waypoints. Choose the type of nav aids you wish to be included and the distance along the waypoints. Click on **Autogenerate**, and you have got yourself a flight plan.

You can also insert and transfer any new nav aid or waypoint you wish to the flight plan. If you do not know the precise coordinates for any given point, use the database search. The database included with Flight Director 98 has 25,000 editable entries. The software also incorporates a special scanning program that imports nav aids and airports from add-on scenery .BGL files into the established database. There is no need to produce elaborate and/or cryptic database files.

Back in the main window, load the MetGen flightplan (see Figure 9) and send it to FS 98 (see Figure 10).

The Map, GPS and EFIS Windows



The EFIS has two range rings within a 90° arc (inner and outer limits are 8 and 15 miles to 150 and 290 miles). In the EFIS you can toggle VOR, NDB, airport and waypoints. Clicking on a point will display

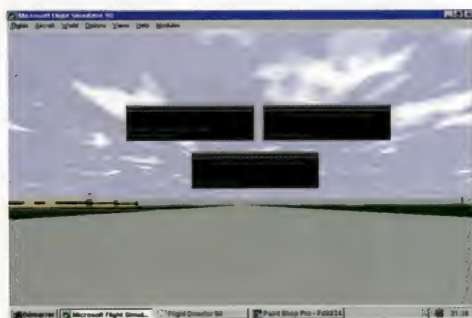
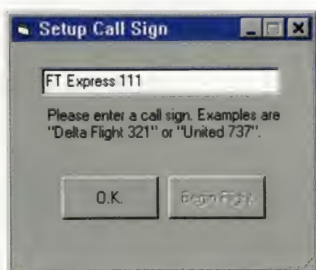
Feature Review: Flight Director 98

additional information. You can also activate the autopilot in EFIS or MAP mode (see Figure 6).

Fun and Easy ATC

Just like it says: "fun and easy!" If you do not have any enroute charts or IAPs (Instrument Approach Procedure), then you'll like using this simple yet effective ATC module. There is no need to search for or remember any tower or clearance frequency, as the module uses its own generic tower and clearance messages. This mode will only work if you chose "ATC career mode" in the settings. It is also very convenient to choose the "auto roger" option.

To use this function, all you need to do is load a flight plan. Click on the GPS. You will be asked for a call sign.



The ATC window has active choices, such as contact tower, roger, weather report, ask for vectors, etc.

Contact your departure airport tower (click on contact tower). You will be asked to taxi to the runway of your choice, then to hold short and request a take off clearance. After take off, you will be vectored to your

destination airport via all the waypoints in the flight plan. You can ask for weather information at any point of the flight. Upon arrival, control will hand you over to the destination airport control center. From there you will be asked to enter the pattern and ask for landing vectors. Upon landing, you get a welcome message (a definite ego booster!) and are asked to close ATC and receive your flight rating.

Career Management

I'm sure that this module will interest Virtual Airlines. Hub captains create flight routes to be flown. Upon completion of the route, pilots can then send their ratings in return. You will have to fly 100 flight segments before the first review.

Conclusion

Flight Director 98 incorporates a number of useful features that otherwise require several commercial, shareware and freeware add-ons, and it does it better. The ability to use real METAR data, the user-friendly interface, the flight planning/navigation functions and the fun ATC/Career Management features make Flight Director 98 a must-have in one's Flight Simulator software collection.

For More Information

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Product Reviews

Reviewed In This Issue Are:

Extreme Flight Triple Pack
Tokyo Photo-Realistic Scenery
VIP Classic Wings '98
Scenery Thailand, Malaysia, Singapore
Cleared to Land

Extreme Flight Triple Pack: DEA Justice from above Terror in the Air 911 Air Rescue



Review by Brian Howard

Microsoft's Flight Simulator is just that: a simulator. The programmers' goal was to make it "as real as it gets." Unfortunately, real flying can be boring. Sure, pilots experience the thrill of escaping earthly bonds, soaring free far above the land-locked losers below. But beyond that, pilots sit still for hours on end, pointing the plane's nose at a landmark, keeping the wings level, eyes repeatedly roving the panel. Boring flights are good flights. Most pilots are happy to avoid any unusual excitement at cruising altitude.

Which prompts wondering why so many real-world pilots would spend their free time sitting in a chair in front of a virtual control panel. Part of the answer can be found in SimuTech's *Extreme Flight Triple Pack*: *DEA Justice from above*, *Terror in the Air* and *911 Air Rescue*. These unique additions for Microsoft's Flight Simulator encourage pilots to do what they can't (or shouldn't) do in real life: fly dangerously

low, perform touch-and-goes on downtown streets, drop bombs, air-rescue the good guys and punish bad guys from above.

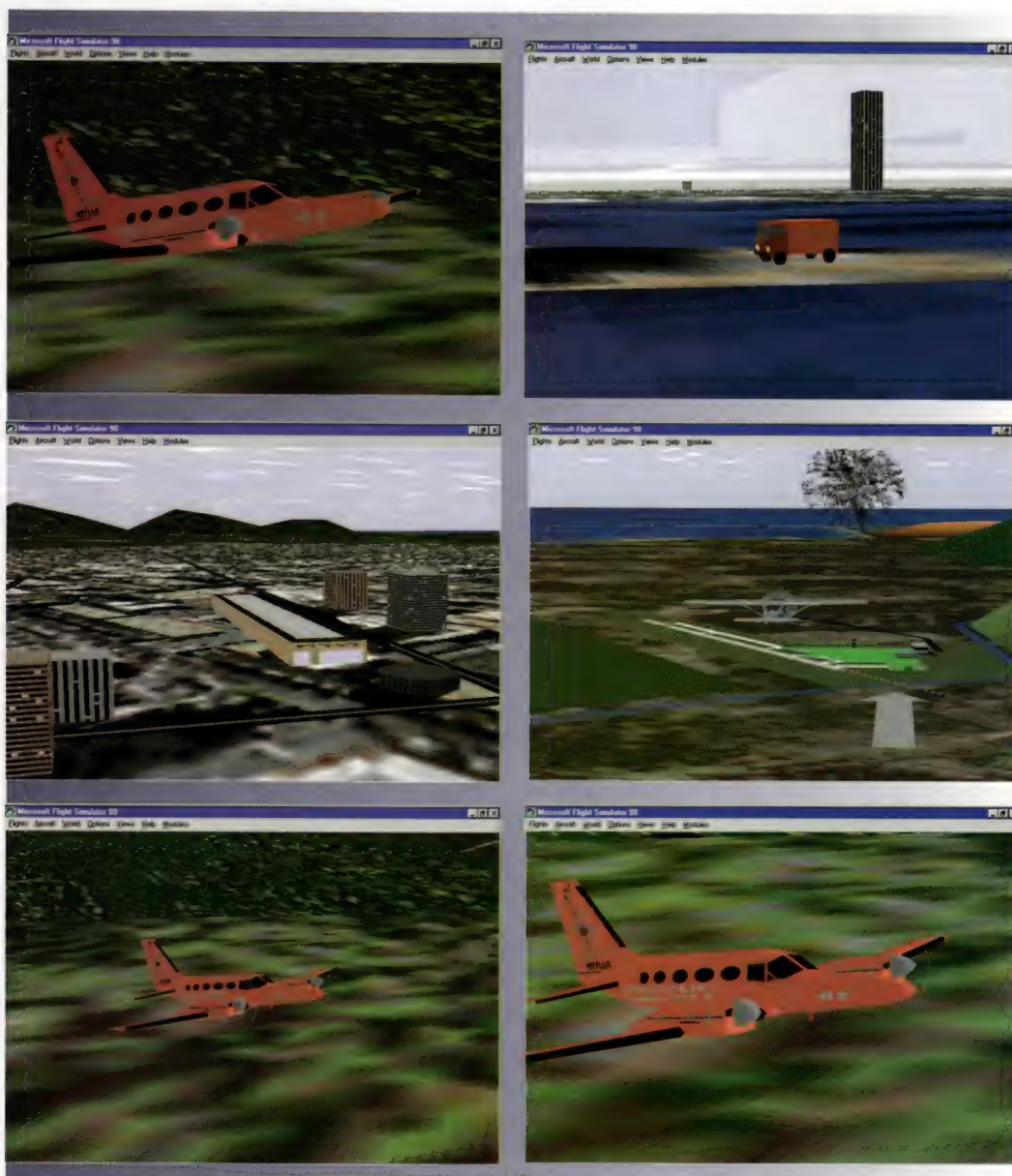
911 Air Rescue and *Terror in the Air* have been available before. Both are now bundled onto one CD with the newest triplet, *DEA Justice from above*. The standard installation allows you to install any or all of the games, depending on your available hard drive space. The installation consists mainly of flights and adventures, placing every file where it needs to be.

The games themselves are interesting and challenging. Anyone but expert FS pilots should allot plenty of time to practicing his (or her) aviation skills before successfully completing these adventures. The specific tasks for each game are randomly generated during loading, so repeating the adventures doesn't mean they become predictable, though they should become easier as you sharpen your skills.

And what skills do you need? Many. In *911 Air Rescue* you pilot an air-rescue Cessna. You have a lot of people to rescue, scattered around Simville, USA, and you only have forty minutes of fuel. Each rescue location has its own NDB. You must precisely follow

all ATC commands to reach the rescue location, land in places that aren't always convenient (like the roof of the shopping center or inside the local quarry), pull your Cessna to within fifty feet of the waiting ambulance, load your passenger, tune in the NDB for your next rescue, and return to the hospital before you run out of fuel. To complicate matters, weather conditions vary, night calls aren't unusual, and your familiar Cessna isn't always in top condition. So besides flying under low bridges, locating the right ambulance, fighting adverse conditions and the clock, you shouldn't have any problems performing your duties.

In *Terror in the Air*, terrorists hold the entire city hostage with a nuclear device. They are demanding ten million dollars in thirty minutes, though negotiations can break down before then. This time, instead of saving a handful of people, you have to save all of them. The ransom is in red armored trucks spread around town. You need to fly to each truck (marked by NDBs) and touch-and-go to catch the cash with your tailhook. As you do this, keep your eyes peeled for other trucks. Some of these contain delay-destruct mechanisms, which will be hid in the money to destroy the terrorists. One truck carries a



Example screens from the program. It's a trip to the mall like you've never made before (middle left). Make certain to find these trucks (top right). Dodging AA fire—fun in the Cessna (middle right).

interesting time after time. This is a great challenge for those who consider themselves excellent, if unconventional, virtual pilots. Preparing for my flights, I thought "This sounds like an interesting variation, but it shouldn't be too difficult." After a dozen attempts that didn't even bring me close to success, I began to rethink my position. Maybe you think you're hot, too—give it a try.

The package includes a thorough manual explaining the background, rules and goals for each game. A small map is provided for each area you'll need. The maps are not great, but that's partly because you're supposed to add information as you learn the flight areas. The more you try, the better you become.

The *Extreme Flight Triple Pack* is an interesting and entertaining variation of Flight Sim add-ons. On each adventure, you'll use conventional piloting skills in unusual ways, which helps you develop your flying skills and adds a new flavor to Microsoft's simulator. All cyber-pilots who are no longer excited by watching their scenery scroll by will find new enthusiasm with the Triple Pack games.

defuser to the bomb. As with the money bags, you must perform solid touch-and-goes to pick up the defuser and delay-destruct device. (And I do mean "solid touch and goes": you won't pick up anything with a rough bounce or two.) Your first goal is obviously to save the populace by picking up and delivering the ransom money. Second, destroy the terrorists with a delay-destruct device. Third and best, defuse the bomb. Again, you'll be flying low in crowded areas in variable conditions.

DEA Justice from above completes the *Extreme Flight* trilogy. Here you're after the criminal mastermind behind the nuclear

terrorists, drug lord Quong. This adventure builds on the skills you developed in the others. Dodging anti-aircraft fire, you'll breathe a sigh of relief each time you touch down to rescue one of the DEA agents. But you can't sit long: each agent you pick up has information that will help you find Quong's headquarters, above which you hope to accurately drop one of your DEA-supplied bombs. Again, the clock is running.

Both *Terror* and *DEA* are set in several cities, each representing a different difficulty level. This and the random generation of mission specifics keeps the adventures

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Tokyo Photo-Realistic Scenery

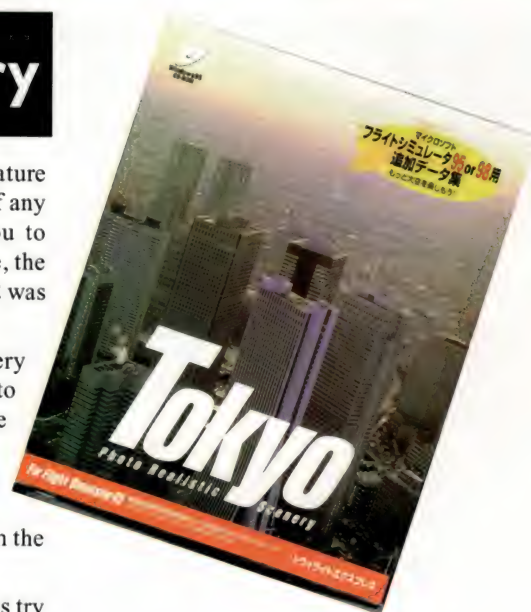
Review by Adam Howe

No need to worry, I don't speak Japanese either, although it would have helped with the manual for the *Tokyo Photo Realistic Scenery* by Lago (distributed by Twilight Express). Although you may not speak or read Japanese, you'll still find the manual educational. The pictures highlight points of interest in the scenery package so you'll know what to look for while taking a leisurely hop up Mt. Fuji to visit the astronomy observatory.

Fall for the landscape textures. This feature was quite impressive—I'm not aware of any other scenery package that allows you to change the season. In the blink of an eye, the scenery was installed and my Cessna 182 was off and running.

Another nice feature of the Scenery Tokyo package is that you do not have to use the Scenery Library in FS to use the scenery. The installation makes the necessary adjustments for you. You also do not have to worry about conflicting information or overlapping scenery from the Microsoft default scenery.

A lot of add-on scenery packages try to simply add more scenery to FS and give the user somewhere new to fly. Scenery Tokyo does more than that. Instead of just a new scenery area, Scenery Tokyo adds high-quality airports with great detail and beautiful coasts, along with a few situations to help you get started. When I first heard the term "Photo Realistic," I expected highly pixelated graphics that were more complex than the FS default textures, but lacked detail. I was obviously wrong. Looking at the FS

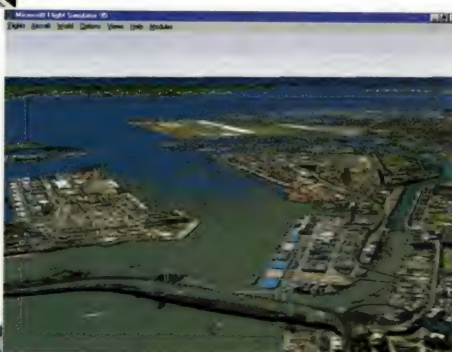


lighting and markers in the middle of a city. The matching of the airport with the texturing is exquisite. I definitely recommend getting a copy of this package for yourself and all your friends. Happy landings!

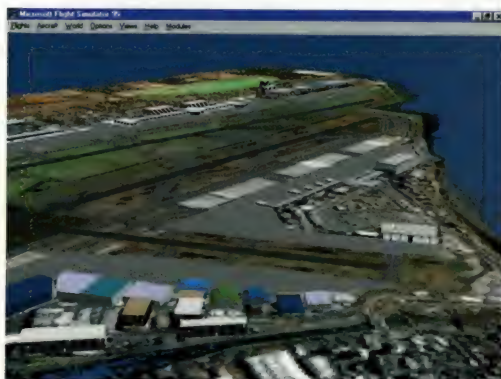


Several approach charts for the airports are also included in the manual as is a fold-out sectional aeronautical chart for Scenery Tokyo. Since these are in English, I had no trouble with them.

During installation you're given a choice of which language you prefer. Then you can choose between Winter, Spring, Summer or



default scenery for most of my flying has been just fine, until now. The way this scenery incorporates the photo-realistic textures with the standard airport features like runways, taxiways and buildings really adds a new dimension to the whole flying experience. Instead of coming in for a landing on a gray strip in the middle of a green square, you can now land on a runway with detailed



For More Information

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VIP Classic Wings '98

Review by Scott M. Slaughter

I mentioned in the last issue of *Full Throttle* that I was looking forward to the next release of **VIP Classic Wings** from PC Aviator and The VIP Group. I'm sure that statement alone did not persuade them to release an FS98 version, but nevertheless I'm happy they did. This is a program to seriously consider if you enjoy Microsoft Flight Simulator. (If you don't have FS98, then seriously consider VIP Classic Wings I for FS95. You can read about it in the previous issue of *Full Throttle*.)

If you're not familiar with VIP, the name stands for "Visually Incredible Panels." Step into the cockpits and you'll see why they've

earned this name. Visually Incredible Panels put you inside the cockpit with realistic, accurately rendered and highly detailed instrument panels. These panels are based on the cockpits of the actual aircraft. Most of the panels come from photos and other real-world data.

VIP Classic Wings 98 is similar to Classic Wings 95 but also includes interesting variations of the cockpits. One example here is the DC-3 where the pilot can take up the right hand co-pilot seat.

As you can see in the following examples, Classic Wings '98 does indeed include "Visually Incredible Panels." You'll be impressed with the panels for the C-130, PS Orion Hurricane, Shorts and all the others.



The ten basic aircraft included with FS98 VIP Classic Wings are also impressive. All aircraft are ready to fly immediately after you install the program. You won't even need to worry about converting the aircraft





A few examples of the aircraft you'll find in Classic Wings '98 include (from top to bottom) Chipmunk Hot Shot, American Eagle Shorts 360 and a U.S. Coast Guard C-130.

because FS98 VIP Classic Wings includes the Microsoft converter program. VIP Classic Wings includes several classic propliners such as the Douglas DC-3 Dakota & Convair 240, 340 and 440. Classic modern jetliners include the Boeing 757. Classic Turboprops include the Lockheed L-188 Electra, P-3 Orion & Convair 580. Other aircraft include the DeHavilland DHC-1 Chipmunk, Aermacchi 339, the classic Lockheed C-130 Hercules and the Shorts 360.

As with Classic Wings 95, VIP includes several variants of each aircraft. Each has customized colors and liveries from famous airlines or other organizations. For example, you can fly a United Airlines Boeing 757, United Nations DC-3, US Coast Guard C-130 Hercules or an American Eagle Shorts 360. These different paint schemes or other modifications bring the total number of aircraft in the package to 100 classic aircraft...truly a "mega collection" as the package claims.

My favorite plane for fun again is the DeHavilland DHC-1 Chipmunk. VIP includes a "custom" version of the Chipmunk called the "Hot Chip," which you can fly for aerobatic fun. It features a more powerful engine and increased rudder and aileron control. My other favorite is the C-130 (versions include the U.S. Coast Guard, Blue Angels, USMC and even Angola Airlines).

This is a good combination of civilian, military and commercial aircraft. Each aircraft is very convincing in quality, detail and flying. They're arguably among the most realistic looking aircraft currently available for Flight Simulator.



Realistic aircraft engine sounds

You've probably seen the term "realistic aircraft" used as often as "scandalous" is used to describe a politician. I think you'd agree that before an aircraft should be considered "realistic" in Flight Simulator 98, it must also include realistic engine sounds. This is the case with VIP Classic Wings too. The VIP sounds were recorded professionally. Select an engine startup/shutdown sound adventure for the Boeing 757 or an aircraft using the heavy Allison turboprops (C-130 Hercules, L-188 Electra and P-3 Orion). The program also includes flight situations that you can select for even more realistic sounds from startup to shut down.

Classic Wings includes a well written and illustrated manual. It starts with very helpful hints on installing Classic Wings, information on instrument panels and even a tutorial on using Classic Wings. My one complaint about the manual is that the type is small and a little on the light side. This

makes reading it difficult times—especially when using Flight Simulator at the same time.

Several pages in the manual describe the aircraft types used in Classic Wings. Not only is information on the history and physical characteristics of the aircraft included but, more importantly, the manual also includes tips on handling the aircraft (flight characteristics, instruments, operations, etc.). This is a great addition if you're not familiar with these aircraft or if your skills need some honing. Read the information in the manual and you'll learn how to successfully taxi, takeoff, fly and land the aircraft.



Other bonuses with VIP Classic Wings include a fleet of aircraft and scenery to use with Westwind Cielo Virtual Airlines. The additional scenery features include custom designed WestWind Cielo hangars at several airports. You'll also get an invitation to join the VIP '98 Pilots Club and information on becoming a VIP Test Pilot. This is all explained in the manual. (If you're not familiar with virtual airlines, see the two articles on virtual airlines in this issue of *Full Throttle*.)

Installation

You won't need to worry about installing extra aircraft, panels, and even sound files with VIP Classic Wings. The installer program in VIP Classic Wings installs everything for you. Simply read and follow the on-screen prompts. Install either a single aircraft or install everything at one time. Then you can activate the new panels and sounds easily. Use the same program if you want to uninstall the aircraft.

For More Information

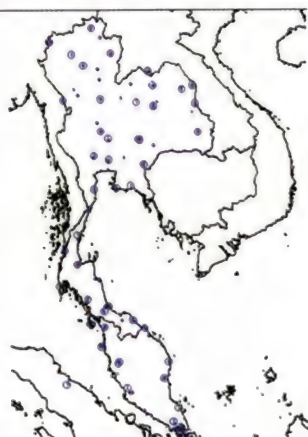
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Scenery Thailand, Malaysia, Singapore

Review by Adam Howe

Let Flight Simulator expose the mysteries of the orient! Let *Scenery Thailand, Malaysia, Singapore* take you places you have always wanted to visit. This package brings the wonders of Thailand, Singapore and Malaysia right into your Flight Simulator. Fly to over 50 airports in two new airliners (FS5.1 and FS6 only) and cover more than 840,000 square kilometers with this one scenery package. A fold-out map showing the locations of all the airports, VORs and NDBs is included in the package to help you orient yourself in the scenery.

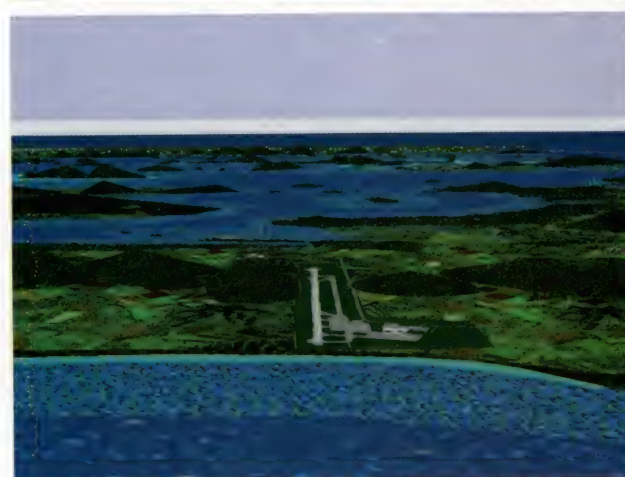


Abacus CoPilot rendition of airports and navaids

Those more interested in the flying portion of FS will find a manual that includes charts of all the information you will need, including approach charts, airport elevation and important radio frequencies. The manual (in both English and German) clearly explains the easy installation.

Scenery Thailand, Malaysia, Singapore does a great job of accurately covering a large area. I found the scenery to be thorough, but lacking a lot of the little things that make a scenery special. Sure, a few buildings and such represent cities, but there is a lot of room for detail to be added to this package. As far as the airports go, they are quite good. I found the airports to be full of detail, including buildings, aprons, towers and hangers.

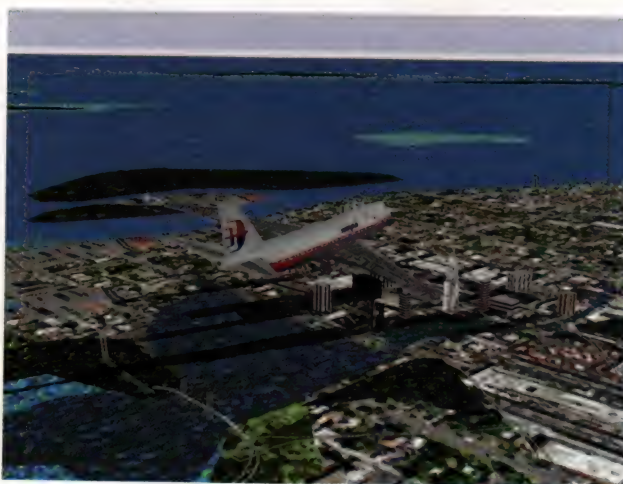
A few aspects that stand out in this scenery are the mountains, islands and the texturing of the ground. With over 6,000 mountains in this package (no, I did not count them), you would think the detail would be lacking, but



it is not. Many scenery packages seem to have generic mountains with little detail placed on the mountains. This package brings great textures to the mountains, giving a great view from above. The islands in this package are not your typical flat, green blobs in the middle of the water. These islands have shape and height (even though they are green).

The texturing of the ground has been reproduced very accurately (not that I've been to Malaysia, but it looks very good). The texturing does not appear to be square or "boxy," but rather is flowing and continuous.

The box states that the two planes, the Thai Airlines Airbus A-300 B4 and the Malaysia Airlines B-747-400, are only compatible with FS 5.1 (with Flight Shop)



and FS6 (FS95). However, if you have a working knowledge of Microsoft's Flight Shop converter, you will be able to use the planes in FS98.

I cannot say much about the flight dynamics, but they do work. All in all, I find this package to be a great value. This is due

not only to the fine scenery and aircraft, but also the charts for the airports and the map of the area that are included in the package, as well as the ease of use and installation. If you know how to use the Scenery Library in FS, you will have no trouble getting this scenery installed. You will be soaring high above the orient in no time.

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Cleared to Land

Review by Scott M. Slaughter

Air traffic chatter is one element that has been missing from Flight Simulator and most add-ons until recently. Today many programs that include ATC chatter are available, giving Flight Simulator enthusiasts a more realistic experience. Cleared to Land, from Lago, takes this one step further.

Cleared to Land is one of the more innovative and exciting expansion programs for Microsoft Flight Simulator. It includes two CD-ROMs featuring actual video footage, scenery and situations. You won't need any additional hardware to view the videos on your PC. This will give you the chance to see how professional pilots perform real landings. It's like you're looking over the shoulder of the pilots as they land and taxi their aircraft. Then take your seat in FS and try the same approach and landing yourself.

Once you've watched the videos, the next step is to load the Flight Simulator situations and adventures in Cleared to Land to land, taxi and takeoff just like the professionals did in the videos. These challenging situations are good practice. The situations include landings at Brussels, Acapulco, Istanbul, Budapest and other airports. You may not be familiar with these airports, so Cleared to Land includes several flight maps and charts for these airports.

The quality of the videos is typically good, as is the sound quality. A faster PC will show a better quality video. However, the manual includes very little description on the specific videos and the situations/adventures of Cleared to Land. But, that gives you the opportunity to test them yourself. The manual basically covers program installation and the video files.

One adventure not mentioned in the manual (but is mentioned in a README.DOC) involves the voices of the



Although you can use an AVI video player (such as Media Player) to view the videos, Cleared to Land includes a video player that you can install. Simply click one of the buttons on the side of the viewer to choose the video you want to watch. Although watching the video won't require you to use additional hardware, it's a good idea to have a sound card installed. Otherwise, you won't be able to hear the pilots and copilots speaking with the ATC in the tower.

Product Reviews

Sabena A320 approach to New York JFK, recreating the same atmosphere you get from the video.

Installation

Cleared to Land is simple to install. Insert the CD-ROM marked with the big "1" and click the SETUP.EXE icon. Then follow the onscreen prompts. The manual also explains how to install and use the Cleared to Land User Interface, so that you can watch the video files.

Requirements

The requirements for Cleared to Land are similar for most other FS add-ons. The aircraft and scenery are compatible with both FS95 and FS98. A CD-ROM drive and sound card are required.

Conclusion

This is an interesting concept in FS add-ons. You can truly learn from the professionals by watching the videos and then doing it yourself. Cleared to Land is a good choice if you want to practice landings or taxi maneuvers. You can also learn the airport chatter by listening to the pilots talk to the ATC while executing the instructions given by the ATC. This will help you understand using FS95 or FS98.

The images on the right show examples of scenes from Cleared to Land. The two images on the far right are the videos that you can watch. (Videos were produced by Just Plane Videos.) They show professional pilots handling taxi, landing and take off routines.

For More Information

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Flight Line

Here is a schedule of events related to the aviation world for the months of August and September. If you do not see the event you are interested in or if you have any specific inquiries or additions, feel free to contact us.

The information in the table was collected from several sources. Although we make every effort to insure the accuracy of this data, please check with the airshow that you plan to attend to confirm dates and times. We've included contact information wherever possible.

Phone: (616) 554-7275

Fax: (616) 554-7279

E-mail: tim@ftmagazine.com

Date(s)	Airshow	Location	Contact
8/1 – 8/2	Air & Space Show	Vandenburg AFB, CA	
8/1 – 8/2	North Bay Heritage Airshow	North Bay, ON, Canada	Cathy Seguin: (705) 474-0400
8/5	Kamloops Intl. Airshow	Kamloops, BC, Canada	Larry Fansson: (205) 828-1404
8/7 – 8/9	CAF Air Power Demo.	St. Paul, MN	Bob Garvin: (612) 922-2382
8/8 – 8/9	Sydney Kinsman Intl. Airshow	Sydney, NS, Canada	Walter Demone: (902) 539-2042
8/8	Borger Camber-Commerce Air Fair	Borger, TX	Randy Hanna: (806) 274-7106
8/8 – 8/9	SkyFest Michiana	Goshen, IN	Dennis Kane: (219) 295-3177
8/8 – 8/9	EAFAIR Airshow	Seattle, WA	
8/9	Air Classics Aurora Air Expo	Sugar Grove, IL	Michael Bianucci: (630) 466-0888
8/14 – 8/16	MCAS Miramar Airshow	San Diego, CA	Rick Soule: (619) 537-4119
8/15 – 8/16	Wings of Eagles Airshow	Elmira, NY	Skip Lehman: (716) 742-2480
8/15 – 8/16	Canada Remembers Airshow	Saskatoon, SK, Canada	Brian Swidrovich: (306) 975-3151
8/15 – 8/16	MKC Aviation Expo	Kansas City, MO	Ed Noyallis: (816) 471-4946
8/21 – 8/23	Rochester Intl. Airshow	Rochester, NY	Cherie Bevona: (716) 256-4960
8/22 – 8/23	Wings of Freedom Airshow	Frederick, MD	Judy Galloway: (301) 631-5357
8/22 – 8/23	Hawthorne Air Faire	Hawthorne, CA	Thomas Quintana: (310) 970-7905
8/22 – 8/23	Chicago Air and Water Show	Chicago, IL	
8/22 – 8/23	Great American Air Circus	Little Rock, AR	Jerry Homsley: (501) 562-5020
8/28 – 8/29	Sussex Airport Airshow	Sussex, NJ	
8/28 – 8/30	Memphis Sky Fest	Memphis, TN	Art Deaton: (901) 873-1818
8/28 – 8/30	Ballunar Liffot Festival	Houston, TX	John Gehbauer: (281) 488-7676
8/29 – 8/30	Offutt AFB Open House	Omaha, NE	Maj. Bennett: (402) 294-3678
8/29 – 8/30	Airshow 98	Halls, TN	Pat Higdon: (901) 836-7448
8/29 – 8/30	Thunder in the Airshow	Thunder Bay, ON, Canada	Patricia Forrest: (807) 625-2565
8/29	Open House	Minot AFB, ND	
8/30	Grand Forks AFB Open House	Grand Forks, ND	
9/4 – 9/7	Sky Parade	Jackson, MS	Richard Dillon: (601) 982-8088



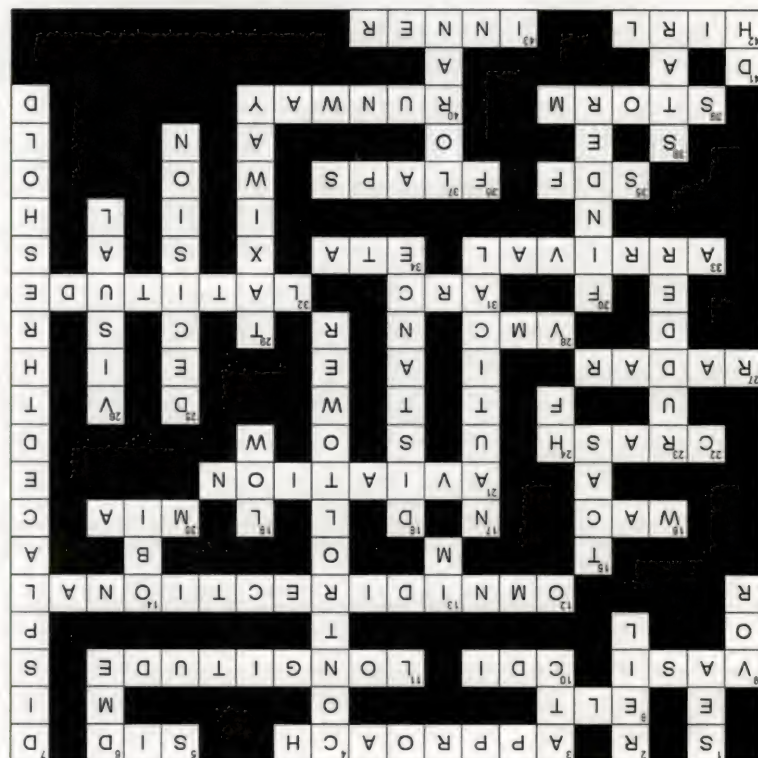
Flightline (continued)

Date(s)	Airshow	Location	Contact
9/5 – 9/7	Canadian Intl. Airshow	Toronto, ON, Canada	Lisa Natale: (416) 393-6061
9/5 – 9/7	Cleveland National Airshow	Cleveland, OH	Dan Biggs: (216) 781-0747
9/5 – 9/7	St. Louis County Fair & Airshow	St. Louis, MO	Bob Hagnauer: (314) 530-9386
9/11 – 9/12	Airshow 98	Price, UT	Andrew King: (801) 637-6506
9/12 – 9/13	Syracuse Intl. Airshow	Syracuse, NY	David Aitken: (315) 454-3263
9/12 – 9/13	Bealeton Flying Circus Aerodrome	Bealeton, VA	
9/12 – 9/13	Skyfest Airshow	Dublin, VA	Debbie Seagle: (919) 447-8584
9/12 – 9/13	Great New England Airshow	Westover AFB, NH	
9/17 – 9/20	Reno Air Races	Reno, NV	702-972-6663
9/19 – 9/20	Airfest 98	Orange, TX	David Anderson: (409) 886-6385
9/25 – 9/27	Boshears Memorial Fly-in	Augusta, GA	
9/28 – 10/4	National Aerobatic Championship	Dallas, TX	Midlothian/Waxahachie Airport

CROSSWINDS

Here's the answers to the Crosswinds crossword puzzle that you'll find on page 50.

Crosswinds comes in for a landing in this issue of Full Throttle. We'll feature more Crosswinds in the future but only if you like them. Let us know what you think by writing to adam@ftmagazine.com with "Crossword" for the subject header.



Demystifying Acronyms

Aviation uses so many specialized terms; it's easy for non-pilots to get lost in the lingo. Here is a list of the most common aviation acronyms you may encounter in Full Throttle, Flight Simulator and other aviation-related materials.

A	
AAS	Airport Advisory Service
AC	Convective outlook
ADF	Automatic Direction Finder
ADIZ	Air Defense Identification Zone
ADM	Aeronautical Decision Making
AFSS	Automated Flight Service Station
AIRMET	Airmen's Meteorological information
ALS	Approach Light System
ALSF	ALS with sequenced Flashers
ALTN	Alternate
AM	Amplitude Modulation
AMA	Area Minimum Altitude
AME	Aviation Medical Examiner
APP	Approach (also AP)
APP CON	Approach Control (also APC)
ARINC	Aeronautical Radio, Inc.
ARP	Airport Reference Point
ARSA	Airport Radar Service Area
ARSR	Air Route Surveillance Radar
ARTCC	Air Route Traffic Control Center
ARTS	Automated Radar Terminal System
ASR	Airport Surveillance Radar
ATC	Air Traffic Control
ATCRBS	ATC Radar Beacon System
ATIS	Automatic Terminal Information Service
AWOS	Automated Weather Observation System
AWW	severe weather forecast alert

B	
BC	Back Course
BCN	Beacon
BRG	Bearing
C	
CAS	Calibrated Airspeed
CAT	Clear Air Turbulence
CAT	Category
CCA	Continental Control Area
CDI	Course Deviation Indicator
CEIL	Ceiling (also CIG)
CL	Coefficient of Lift
CLMAX	Coefficient of Lift Maximum
CLNC	Clearance
CLNC DEL	Clearance Delivery
COP	Change-Over Point
CP	Center of Pressure
CRM	Cockpit Resource Management
CRP	Compulsory Reporting Point
CRS	Course
CTAF	Common Traffic Advisory Freq
CTLZ	Control Zone
CWA	Central Weather Advisories
D	
DA	Density Altitude
DA(H)	Decision Altitude (Height)
DEP	Departure (also DP)
DEP CON	Departure Control (also DPC)
DEWIZ	Distant Early Warning Identification Zone
DH	Decision Height
DME	Distance Measuring Equipment
DOD	Department of Defense
DOT	Department of Transportation
DUAT	Direct User Access Terminal

E	
EAS	Equivalent Airspeed
EFAS	Enroute Flight Advisory Service (Flight Watch)
EFC	Expect Further Clearance
EGT	Exhaust Gas Temperature
F	
FA	Area forecast
FAC	Final Approach Course
FAF	Final Approach Fix
FBO	Fixed Base Operator
FD	Forecast of wind and temperatures aloft
FDC	Flight Data Center
FIR	Flight Information Region
FL	Flight Level
FLIP	Flight Information Publication
FT	Terminal forecast
G	
GCA	Ground Controlled Approach
GS	Glideslope (also groundspeed)
GSIP	Glideslope Intercept Point
H	
HAA	Height Above Airport
HAT	Height Above Touchdown
HIRL	High Intensity Runway Lights
HIWAS	Hazardous In-flight Weather Advisory Service
HIS	Horizontal Situation Indicator
HVOR	High-Altitude VOR
I	
IAC	Instrument Approach Chart
IAF	Initial Approach Fix
IAP	Instrument Approach Procedure
IAS	Indicated Airspeed

I (Continued)	
ICAO	International Civil Aviation Organization
IF	Intermediate Fix
IFR	Instrument Flight Rules
ILS	Instrument Landing System
IM	Inner Marker
IMC	Instrument Meteorological Conditions
INS	Inertial Navigation System
INT	Intersection
IR	IFR military training route
ISA	International Standard Atmosphere
IVRS	Interim Voice Response System
IVSI	Instantaneous Vertical Speed Indicator
J	
J-AID	Jeppesen Airport and Information Directory
K	
KIAS	Knots Indicated Airspeed
KTAS	Knots True Airspeed
L	
LCL	Local
LDA	Localizer-type Directional Aid
LDI	Landing Direction Indicator
LDIN	Lead-in light system
LIFR	Low IFR
LIM	Locator Inner Marker
LIRL	Low-Intensity Runway Lights
LLWAS	Low-Level Wind shear Alert System
LMM	Locator Middle Marker
LOC	Localizer
LOM	Locator Outer Marker
LORAN	Long Range Navigation
LR	Lead Radial
LT	Local Time
LVOR	Low-altitude VOR
M	
MAA	Maximum Authorized Altitude
MAC	Mean Aerodynamic Chord
MALS	Medium-Intensity Approach Light System
MALSF	MALS with sequenced Flashers
MALSR	MALS with RAIL

M (Continued)	
MAP	Missed Approach Point
MCA	Minimum Crossing Altitude
MDA(H)	Minimum Descent Altitude (Height)
MDH	Minimum Descent Height
MEA	Minimum Enroute Altitude
MF	Medium Frequency
MHA	Minimum Holding Altitude
MIRL	Medium-Intensity Runway Lights
MKR	Marker
MLS	Microwave Landing System
MM	Middle Marker
MOA	Military Operations Area
MOCA	Minimum Obstruction Clearance Altitude
MRA	Minimum Reception Altitude
MSA	Minimum Safe Altitude
MSAW	Minimum Safe Altitude Warning
MTR	Military Training Route
MVA	Minimum Vectoring Altitude
MVFR	Marginal VFR
N	
NA	Not Authorized
NAR	North American Route (also refers to North Atlantic Route)
NAWAU	National Aviation Weather Advisory Unit
NDB	Non-Directional Beacon/radio beacon
NMC	National Meteorological Center
NOAA	National Oceanic and Atmospheric Administration
NoPT	No Procedure Turn
NORDO	No Radio
NOS	National Ocean Service
NOTAM	Notice to Airmen
NSSFC	National Severe Storms Forecast Center
NTSB	National Transportation Safety Board
NWS	National Weather Service
O	
OBS	Omnibearing Selector
ODALS	Omnidirectional Approach Light System
OM	Outer Marker
OTS	Out of Service

P	
PA	Pressure Altitude
PAPI	Precision Approach Path Indicator
PAR	Precision Approach Radar
PATWA	Pilot's Automatic Telephone Weather Answering Service
PCA	Positive Control Area
PCL	Pilot Controlled Lighting
PIREP	Pilot Report
PPR	Prior Permission Required
PT	Procedure Turn
PTS	Practical Test Standard
R	
R	Radial
RA	Radio Altimeter
RADAR	Radio Detection and Ranging
RADAT	freezing level data
RAIL	Runway Alignment Indicator Lights
RAPCO	Radar Approach Control (USAF)
RAREP	Radar weather Report
RB	Relative Bearing
RCAG	Remote Communications Air/Ground facility
RCLS	Runway Centerline Light System
RCO	Remote Communications Outlet
REIL	Runway End Identifier Lights
RMI	Radio Magnetic Indicator
RMK	Remark
RNAV	area Navigation
RRL	Runway Remaining Lights
RRWDS	Radar Remote Weather Display System
RS	Record Special
RSC	Runway Surface Condition
RTS	Return To Service
RVR	Runway Visual Range
RVV	Runway Visibility Value
RWY	Runway
S	
SA	Surface Aviation weather report
SALS	Short Approach Light System
SAR	Search And Rescue
SCATAN	Security Control of Air Traffic and Air Navigation Aids
SDF	Simplified Directional Facility
SFL	Sequenced Flashing Lights



S (Continued)	
SID	Standard Instrument Departure
SIGMET	Significant Meteorological information
SP	Special report
SQ	Squawk
SSALS	Simplified SALS
SSALSF	SSALS with SFL
SSALSR	SSALS with RAIL
SSV	Standard Service Volume
STAR	Standard Terminal Arrival Route
STBY	Standby
STC	Sensitivity Time Control
T	
TA	Transition Altitude
TACAN	Tactical Air Navigation
TAS	True Airspeed
TCA	Terminal Control Area
TCH	Threshold Crossing Height
TDZ	Touchdown Zone
TDZ/CL	Touchdown Zone and runway Centerline Lighting
TDZE	Touchdown Zone Elevation
TDZL	Touchdown Zone Lights
TEC	Tower Enroute Control
TEL-TW	Telephone access to TWEB
TERPS	U.S. Standard for Terminal Instrument Procedures
TIBS	Telephone Information Briefing Service
TLv	Transition Level (also TL)
TPA	Traffic Pattern Altitude
TRACO	Terminal Radar Approach Control
TRSA	Terminal Radar Service Area
TVOR	Terminal VOR
TWEB	Transcribed Weather Broadcast
U	
UA	pilot report (PIREP) message identifier
UFN	Until Further Notice
UNICO	Aeronautical advisory station
UTC	Coordinated Universal Time (Zulu time)
V	
V-speed	Performance speeds
VASI	Visual Approach Slope Indicator
VDP	Visual Descent Point
VFR	Visual Flight Rules

V (Continued)	
VIS	Visibility
VMC	Visual Meteorological Conditions
VOR	VHF Omnidirectional Radio range
VOR/DM	Collocated VOR and DME nav aids
VORTA	collocated VOR and TACAN nav aids
VOT	VOR Test facility
VR	VFR military training route
VRS	Voice Response System
VSI	Vertical Speed Indicator
VVI	Vertical Velocity Indicator
WA	AIRMET message identifier
WMSC	Weather Message Switching Center
WPT	Waypoint
WS	SIGMET message identifier
WSFO	Weather Service Forecast Office
WSO	Weather Service Office
WST	convective SIGMET message identifier
WW	severe Weather Watch bulletin
WX	Weather
Z	Zulu time (UTC)

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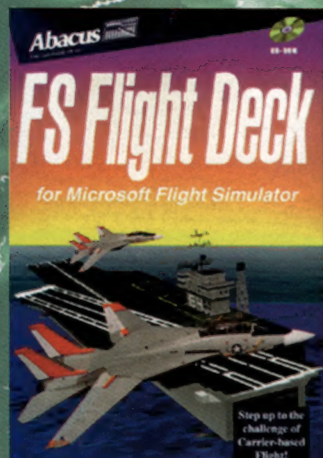
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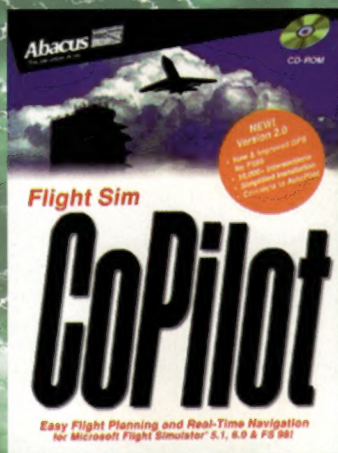
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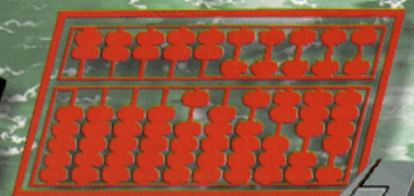
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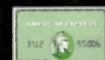
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